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NSA CRANE

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U S NAVY RESPONSE TO U S EPA REGION V COMMENTS ON DRAFT FINAL INTERIM  
MEASURES WORK PLAN UNEXPLODED ORDNANCE 7 (UXO 7) OLD RIFLE RANGE AND  
TRAP RANGE NSA CRANE IN

7/1/2012

U S NAVY

RESPONSES TO USEPA REGION 5 COMMENTS DATED 08/08/13 ON  
DRAFT FINAL INTERIM MEASURES WORK PLAN  
UXO 7 – OLD RIFLE RANGE AND TRAP RANGE  
DATED JULY 2012  
NSA CRANE

**Comment 1:**

The last sentence on page 1-2 referring to the Old Pistol Range makes the statement that they have been approved for no further action. EPA approved the IMR, but I don't recall there being an NFA approval issued for the OPR.

RESPONSE: The Interim Measures Work Plan (IMWP) specified a media cleanup standard of 400 mg/kg for lead. Interim measures were conducted in accordance with the IMWP. EPA approved the Interim Measures Report (IMR) for the OPR on 9/22/08. Section 3 of the IMR contained the following conclusion:

*"This IM Report summarizes the work performed at NSWC Crane, SWMU 7 by D&T and the verification and confirmation sampling conducted by Tetra Tech."*

*Based on the results of confirmation sample analyses performed by the fixed-base laboratory (see Appendix D), the residual soil remaining within the Range 1 and Range 2 berms at the OPR is acceptable considering the United States Environmental Protection Agency (U.S. EPA) residential soil levels for lead. No further excavation of soil is required."*

**Comment 2:**

Referring to page 2-10, the MCGs for lead are identified as 192 mg/kg and a "no soil remaining with a lead concentration greater than 652 mg/kg." The 652 mg/kg value appears to be the plant PRG from the SWMU 16 toxicity study, although this is not explicitly stated in the IMWP. The plant PRG from SWMU 16 was influenced by soil pH and the Navy would need to provide soil data that shows typical soil pH at UXO 7 is in the range of 7 to 7.5. The lead NOEC and LOEC samples used to develop the plant PRG at SWMU 16 had pH values of 7.54 and 7.33, respectively. If the typical soil pH for SWMU 7 (UXO) is closer to 6, a lower plant PRG needs to be considered.

RESPONSE: While the Navy indicated in the SWMU 16 toxicity study report that soil pH appeared to influence the plant growth in the toxicity test, the PRG was not adjusted by the soil pH. In fact, the Navy conservatively agreed to a PRG for plants even though it was likely that a portion of the toxicity was due to low pH. It is not clear how the plant PRG would be modified if the pH in the soil at UXO 7 was closer to 6.0 because there is not a direct correlation between pH and the PRG. That being said, the soil pH in five recently collected soil samples at UXO 7 were measured at 5.68, 6.71, 6.94, 6.97, and 7.87 standard units for an average of 6.8. Therefore, the average pH is close to 7.0. Also, there are only a few

locations at UXO 7 with lead concentrations between 600 and 650 mg/kg remaining at the site. Most of the remaining lead detections will be less than 600 mg/kg with the majority of those being less than 400 mg/kg. Therefore, any potential impacts to plants would be minimal and not ecologically significant. This is especially true because the site is already grass covered and it is unlikely that plants are currently being significantly impacted. Moreover, the samples at UXO 7 are very close to each other, so any potentially impacted area would tend to be very small.

**Comment 3:**

**Referring to the last full paragraph on page 2-5, the human health and ecological risk assessments should be further refined after completion of this IM removal action to reflect the current site risks. This may be done in an addendum to the RFI's currently created (2009 and 2012) or in a Corrective Measures Proposal.**

**RESPONSE:** The IMR will contain refinements of the health and ecological risk assessments based on residual contamination remaining after completion of the IM removal actions.

**Comment 4:**

**Referring to the last full paragraph on page 2-10, the text states that analytical results from the RFI indicated an excess human health residential exposure from lead. This does not seem to be the conclusion of either the 2009 RFI or the 2012 RFI Addendum. Please clarify the basis for this statement in the IMWP.**

**RESPONSE:** The conclusions regarding health risk in the 2009 RFI were based on the data available at that time. Additional data became available after the 2009 RFI was submitted. These data showed that soil lead concentrations were higher. Within the Central Area of the Northern Zone, the average lead concentration was 401 mg/kg. Section 4.0 "Human Health Risk Assessment" of the December 2012 submittal included the statement, "However, this concentration would not be expected to result in exceedence of US EPA's goals for lead." This statement was based on a comparison of the average concentration to the 400 mg/kg criterion. The last sentence of Section 4 stated "Because the attainment of ecological MCGs will significantly reduce lead concentrations in the northern Zone Central Area to below 278 mg/kg it was not necessary to reevaluate lead risks."

Section 2.3.3 "Lead Risk Reduction and Mitigation in UXO 7 Former Old Rifle Range Soil" paragraph 2 has been revised to read as follows:

*The Drainage Area, 400-yard Berm Area, and Dirt Mound Area within the Northern Zone of the ORR at UXO 7 were initially investigated as part of an RFI in 2007. Additional samples were collected to delineate lead contamination. Average lead concentrations were 401 mg/kg with some concentrations as high as 4,000 mg/kg. The source of lead contamination detected in soil from these areas is a result of lead bullets fired at the range.*

**Comment 5:**

Referring to the proposed excavations and Table 3-3, the Navy is not proposing to collect post excavation confirmation samples. For each excavation area (excluding the removal of the dirt mound area), please identify how the characterization sampling performed provides an equivalent level of useful data on residual contaminant concentrations for decision-making and risk assessment for the excavation floors as previous Navy verification sampling approaches (e.g. MFA Battery IMWP, Mine Fill B IMWP). Propose rationale for not collecting sidewall samples at the excavation areas. In some areas, sidewall sampling may be warranted to collect data for risk assessment purposes or additional excavation at the Navy's discretion (e.g. northernmost area of the west trap range as shown on Figure 2-7).

**RESPONSE:** The Navy will conduct limited composite soil sampling for residual lead and soil PAH contamination within proposed excavation sidewalls and floors, as appropriate, to support the reassessment of risks within the UXO 7 hot spot soil removal subareas. If there are sufficient existing sample data to characterize the concentrations of PAH or lead in a proposed excavation floor or excavation sidewall (based on a previously collected soil sample at a known point), then additional sampling will not be required to assess exposure risks for those excavation limits. Soil samples will be collected in accordance with an approved sampling plan. The post-excavation soil analytical data will be used to support the reassessment of human and ecological receptor exposure risks due to the residual (post-removal action) concentrations of lead and PAHs in the soil at UXO 7 and will confirm that post-removal action exposure risks at the UXO 7 site are within the acceptable risk range.

**Comment 6:**

Section 2 discusses the BaP equivalents approach procedure, but it does not cite a document where the Navy introduced their plan to use the procedure. Also, please describe how the Navy calculated a Risk Based Screening Level corresponding to a risk level of  $1 \times 10^{-4}$ , or 1.5 mg/kg BaP equivalent concentration. The Navy appears to evaluate PAH for the 7 carcinogenic PAHs only. It's not clear if the non-carcinogenic PAHs (e.g., fluoranthene, naphthalene) were including in the sample analysis.

**RESPONSE:** The samples analysis data included non-carcinogenic PAHs. Tables 6A, 6B, and 6C contain the data including a comparison the EPA RSLs for the non-carcinogenic PAHs. None of the non-carcinogenic PAHs were present in concentrations above their respective screening levels. The non-carcinogenic PAHs were present only in samples which also contained carcinogenic PAHs.

TABLE 6a

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
2007 RFI SAMPLE COLLECTION  
UXO 07  
NAVAL SUPPORT ACTIVITY  
CRANE, INDIANA

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB071 X7-SS071-0002 20071005	X7-SB075 X7-SS075-0002 20071005	X7-SB079 X7-SS079-0002 20071005	X7-SB081 X7-SS079-0002-D 20071005	X7-SB086 X7-SS086-0002 20071005	X7-SB116 X7-SS116-0002 20071006	X7-SB121 X7-SS121-0002 20071006	X7-SB122 X7-SS122-0002 20071006	X7-SB123 X7-SS123-0002 20071006	X7-SB129 X7-SS129-0002 20071006	X7-SB136 X7-SS136-0002 20071006	
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>														
<b>CARCINOGENS</b>														
BAP EQUIVALENT-HALFND	NC	NC	0.0213	0.2321	0.0010 U	0.0010 U	0.0010 U	0.0010 U	1.2016	11.2544	0.0181	2.2173	0.1115	0.0010 U
BAP EQUIVALENT-POS	NC	NC	0.0208	0.2321	0.0010 U	0.0010 U	0.0010 U	0.0010 U	1.2016	11.2544	0.0175	2.2173	0.1110	0.0010 U
BENZO(A)ANTHRACENE	NC	NC	0.0120	0.1400	0.0009 U	0.0009 U	0.0009 U	0.0010 UU	0.6400	6.4000	0.0100	1.2000	0.0550	0.0010 U
BENZO(A)PYRENE	NC	NC	0.0170	0.1700	0.0010 U	0.0010 U	0.0010 U	0.0010 UU	0.8900 J	8.1000 J	0.0140	1.6000 J	0.0680	0.0010 U
BENZO(B)FLUORANTHENE	NC	NC	0.0200	0.2300	0.0009 U	0.0009 U	0.0009 U	0.0010 UU	1.4000 J	12.0000 J	0.0200	2.7000 J	0.1300	0.0010 U
BENZO(K)FLUORANTHENE	NC	NC	0.0080	0.0920	0.0005 U	0.0005 U	0.0005 U	0.0005 UU	0.4900 J	4.7000 J	0.0064 J	0.8800 J	0.0480	0.0005 U
CHRYSENE	NC	NC	0.0130	0.1600	0.0008 U	0.0009 U	0.0008 U	0.0009 UU	0.7300	7.4000	0.0130	1.5000	0.0760	0.0009 U
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0011 U	0.0180	0.0010 U	0.0011 U	0.0011 U	0.0011 UU	0.0690 J	0.9700 J	0.0012 U	0.1500 J	0.0011 U	0.0011 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0048 J	0.0600	0.0012 U	0.0013 U	0.0012 U	0.0013 UU	0.3300 J	2.9000 J	0.0047 J	0.6700 J	0.0390	0.0013 U
<b>NON-CARCINOGENS</b>														
2-METHYLNAPHTHALENE	230	2200	0.0016 U	0.0018 U	0.0016 U	0.0016 U	0.0016 U	0.0017 U	0.0039 J	0.0400	0.0018 U	0.0070	0.0016 U	0.0017 U
ACENAPHTHENE	3400	33000	0.0012 U	0.0049 J	0.0011 U	0.0012 U	0.0011 U	0.0012 U	0.0300	0.5500 J	0.0013 U	0.0950	0.0012 U	0.0012 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0006 U	0.0007 U	0.0006 U	0.0006 U	0.0006 U	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0270	0.0007 U	0.0007 U
ANTHRACENE	17000	170000	0.0009 U	0.0072	0.0008 U	0.0009 U	0.0008 U	0.0009 U	0.0640	0.9700	0.0010 U	0.1700	0.0042 J	0.0009 U
BENZO(G,H,I)PERYLENE	--	--	0.0071	0.0480	0.0010 U	0.0010 U	0.0010 U	0.0010 UU	0.3400 J	2.9000 J	0.0057 J	0.7300 J	0.0360	0.0010 U
FLUORANTHENE	2300	22000	0.0150	0.1800	0.0008 U	0.0009 U	0.0008 U	0.0009 U	0.7800	8.7000	0.0140	1.3000	0.0760	0.0009 U
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0007 U	0.0046 J	0.0006 U	0.0007 U	0.0006 U	0.0007 U	0.0160	0.2700	0.0007 U	0.0420	0.0007 U	0.0007 U
NAPHTHALENE	3.6	18	0.0012 U	0.0013 U	0.0011 U	0.0012 U	0.0011 U	0.0012 U	0.0012 U	0.0014 U	0.0013 U	0.0010 U	0.0012 U	0.0012 U
PHENANTHRENE	--	--	0.0011 U	0.0300	0.0010 U	0.0011 U	0.0011 U	0.0011 U	0.2800	4.9000	0.0012 U	0.6800	0.0210	0.0011 U
PYRENE	1700	17000	0.0170	0.2000	0.0010 U	0.0011 U	0.0011 U	0.0011 UU	1.2000	14.0000	0.0150	2.7000	0.0860	0.0032 J

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10<sup>-4</sup>Indicates a cancer risk exceeding 10<sup>-5</sup>

Compounds not included in calculation for BaP equivalent

J - Estimated concentration

U - Concentration is less than laboratory detection limit

UJ - Concentration is less than laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
 1 OF 16

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB200		X7-SB201		X7-SB202		X7-SB203			
			X7-SS200-0001 20111110	X7-SS200-0102 20111110	X7-SS201-0001 20111110	X7-SS201-0102 20111110	X7-SS202-0001 20111110	X7-SS202-0102 20111110	X7-SS203-0001 20111110	X7-SS203-0102 20111110		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.0707	0.0254	85.2068	0.0068	0.8697	0.0080	2.3358	0.1940		
BAP EQUIVALENT-POS	NC	NC	0.0707	0.0254	<b>85.2068</b>	0.0046	<b>0.8697</b>	0.0080	<b>2.3358</b>	0.1940		
BENZO(A)ANTHRACENE	NC	NC	0.0325	0.0094 J	52.3000	0.0029 J	0.4740	0.0033 J	1.3200	0.1070		
BENZO(A)PYRENE	NC	NC	0.0463	0.0163	56.6000	0.0035 J	0.5890	0.0041 J	1.5400	0.1270		
BENZO(B)FLUORANTHENE	NC	NC	0.0627	0.0198	79.4000	0.0047 J	0.7330	0.0051 J	2.0500	0.1660		
BENZO(K)FLUORANTHENE	NC	NC	0.0226	0.0078 J	23.0000	0.0043 U	0.2940	0.0029 J	0.7070	0.0614		
CHRYSENE	NC	NC	0.0436	0.0121	66.8000	0.0031 J	0.5930	0.0037 J	1.7600	0.1380		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0102	0.0045 J	10.3000	0.0043 U	0.1050	0.0027 J	0.3070	0.0272		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0444	0.0158	48.4000	0.0038 J	0.5150	0.0037 J	1.4300	0.1170		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0044 U	0.0048 U	0.3180	0.0043 U	0.0026 J	0.0041 U	0.0084	0.0042 U		
2-METHYLNAPHTHALENE	230	2200	0.0044 U	0.0048 U	0.3620	0.0043 U	0.0028 J	0.0041 U	0.0097	0.0042 U		
ACENAPHTHENE	3400	33000	0.0022 J	0.0048 U	2.3000	0.0043 U	0.0156	0.0041 U	0.0557	0.0058 J		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0044 U	0.0048 U	0.0403 U	0.0043 U	0.0041 U	0.0041 U	0.0039 U	0.0042 U		
ANTHRACENE	17000	170000	0.0030 J	0.0048 U	2.5600	0.0043 U	0.0212	0.0041 U	0.0616	0.0065 J		
BENZO(G,H,I)PERYLENE	--	--	0.0536	0.0176	48.3000	0.0036 J	0.5310	0.0048 J	1.4800	0.1170		
FLUORANTHENE	2300	22000	0.0467	0.0155	61.4000	0.0040 J	0.5840	0.0033 J	1.5700	0.1250		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0044 U	0.0048 U	1.2400	0.0043 U	0.0041 U	0.0041 U	0.0288	0.0035 J		
NAPHTHALENE	3.6	18	0.0044 U	0.0048 U	1.4300	0.0043 U	0.0080 J	0.0041 U	0.0386	0.0070 J		
PHENANTHRENE	--	--	0.0166	0.0073 J	13.7000	0.0027 J	0.1220	0.0022 J	0.3470	0.0354		
PYRENE	1700	17000	0.0450	0.0147	62.6000	0.0040 J	0.5980	0.0032 J	1.6000	0.1280		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.



Indicates a cancer risk exceeding 10<sup>-4</sup>

Indicates a cancer risk exceeding 10<sup>-5</sup>

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
 2 OF 16

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB204			X7-SB205			X7-SB206			X7-SB207					
			X7-SS204-0001 20111110	X7-SS204-0102 20111110	X7-SS205-0001 20111110	X7-SS205-0102 20111110	X7-SS205-0102-D 20111110	X7-SS206-0001 20111110	X7-SS206-0102 20111110	X7-SS207-0001 20111110	X7-SS207-0102 20111110						
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>																	
<b>CARCINOGENS</b>																	
BAP EQUIVALENT-HALFND	NC	NC	0.2854	0.0040 U	0.0330	0.0055	0.0041 U	0.0043 U	0.0069	0.6108	0.0095						
BAP EQUIVALENT-POS	NC	NC	0.2854	0.0040 U	0.0309	0.0033	0.0041 U	0.0043 U	0.0046	<b>0.6108</b>	0.0074						
BENZO(A)ANTHRACENE	NC	NC	0.1570 J	0.0040 U	0.0190	0.0040 U	0.0041 U	0.0043 U	0.0023 J	0.3500	0.0041 J						
BENZO(A)PYRENE	NC	NC	0.1870 J	0.0040 U	0.0234	0.0027 J	0.0041 U	0.0043 U	0.0037 J	0.4190	0.0059 J						
BENZO(B)FLUORANTHENE	NC	NC	0.2410 J	0.0040 U	0.0311	0.0035 J	0.0041 U	0.0043 U	0.0040 J	0.5500	0.0066 J						
BENZO(K)FLUORANTHENE	NC	NC	0.0910 J	0.0040 U	0.0117	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.2200	0.0028 J						
CHRYSENE	NC	NC	0.1930 J	0.0040 U	0.0240	0.0024 J	0.0041 U	0.0043 U	0.0030 J	0.4510	0.0050 J						
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0397	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.0658	0.0041 U						
INDENO(1,2,3-CD)PYRENE	NC	NC	0.1780 J	0.0040 U	0.0234	0.0029 J	0.0041 U	0.0043 U	0.0027 J	0.3330	0.0048 J						
<b>NON-CARCINOGENS</b>																	
1-METHYLNAPHTHALENE	16	53	0.0039 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.0024 J	0.0041 U						
2-METHYLNAPHTHALENE	230	2200	0.0039 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.0027 J	0.0041 U						
ACENAPHTHENE	3400	33000	0.0081	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.0134	0.0041 U						
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0039 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.0040 U	0.0041 U						
ANTHRACENE	17000	170000	0.0111	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.0208	0.0041 U						
BENZO(G,H,I)PERYLENE	--	--	0.1900 J	0.0040 U	0.0251	0.0026 J	0.0041 U	0.0043 U	0.0035 J	0.3440	0.0051 J						
FLUORANTHENE	2300	22000	0.2100 J	0.0040 U	0.0258	0.0030 J	0.0041 U	0.0043 U	0.0041 J	0.4570	0.0069 J						
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0040 J	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.0068 J	0.0041 U						
NAPHTHALENE	3.6	18	0.0039 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0043 U	0.0045 U	0.0073 J	0.0041 U						
PHENANTHRENE	--	--	0.0657 J	0.0040 U	0.0090	0.0021 J	0.0041 U	0.0022 J	0.0030 J	0.1220	0.0042 J						
PYRENE	1700	17000	0.2110 J	0.0040 U	0.0256	0.0029 J	0.0041 U	0.0043 U	0.0037 J	0.4490	0.0065 J						

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthyrene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UU - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered



TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
 3 OF 16

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB208		X7-SB209		X7-SB210		X7-SB211			
			X7-SS208-0001 20111110	X7-SS208-0102 20111110	X7-SS209-0001 20111110	X7-SS209-0102 20111110	X7-SS210-0001 20111110	X7-SS210-0102 20111110	X7-SS211-0001 20111110	X7-SS211-0102 20111110		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	1.3137	0.0111	0.2545	0.0169	0.4863	0.0099	1.7173	0.0133		
BAP EQUIVALENT-POS	NC	NC	<b>1.3137</b>	0.0091	0.2545	0.0169	0.4863	0.0079	<b>1.7173</b>	0.0133		
BENZO(A)ANTHRACENE	NC	NC	0.6950	0.0056 J	0.1350	0.0078 J	0.2870 J	0.0051 J	1.0300	0.0067 J		
BENZO(A)PYRENE	NC	NC	0.8730	0.0069 J	0.1690	0.0108	0.3240 J	0.0059 J	1.1400	0.0080 J		
BENZO(B)FLUORANTHENE	NC	NC	1.2400	0.0092	0.2260	0.0139	0.4420	0.0087	1.5900	0.0102		
BENZO(K)FLUORANTHENE	NC	NC	0.3820	0.0037 J	0.0823	0.0059 J	0.1570 J	0.0036 J	0.4910	0.0040 J		
CHRYSENE	NC	NC	0.9330	0.0065 J	0.1730	0.0108	0.3540	0.0062 J	1.3800	0.0078 J		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.1680	0.0041 U	0.0335	0.0029 J	0.0589	0.0039 U	0.2090	0.0030 J		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.7440	0.0073 J	0.1490	0.0096	0.2860 J	0.0061 J	1.0000	0.0065 J		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0052 J	0.0041 U	0.0041 U	0.0039 U	0.0021 J	0.0039 U	0.0072 J	0.0042 U		
2-METHYLNAPHTHALENE	230	2200	0.0061 J	0.0041 U	0.0041 U	0.0039 U	0.0026 J	0.0039 U	0.0087	0.0042 U		
ACENAPHTHENE	3400	33000	0.0308	0.0041 U	0.0059 J	0.0039 U	0.0097	0.0039 U	0.0472	0.0042 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0042 U	0.0041 U	0.0041 U	0.0039 U	0.0040 U	0.0039 U	0.0042 U	0.0042 U		
ANTHRACENE	17000	170000	0.0361	0.0041 U	0.0077 J	0.0039 U	0.0126	0.0039 U	0.0588	0.0042 U		
BENZO(G,H,I)PERYLENE	--	--	0.7640	0.0067 J	0.1610	0.0098	0.2910 J	0.0064 J	1.0200	0.0075 J		
FLUORANTHENE	2300	22000	0.8860	0.0070 J	0.1710	0.0103	0.3420	0.0059 J	1.3000	0.0084		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0145	0.0041 U	0.0030 J	0.0039 U	0.0040 U	0.0039 U	0.0235	0.0042 U		
NAPHTHALENE	3.6	18	0.0200	0.0041 U	0.0041 U	0.0039 U	0.0082	0.0039 U	0.0247	0.0042 U		
PHENANTHRENE	--	--	0.2040	0.0027 J	0.0435	0.0035 J	0.0717	0.0020 J	0.3370	0.0034 J		
PYRENE	1700	17000	0.9070	0.0066 J	0.1730	0.0103	0.3480	0.0055 J	1.3000	0.0081 J		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.



Indicates a cancer risk exceeding 10<sup>-4</sup>

Indicates a cancer risk exceeding 10<sup>-5</sup>

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB212		X7-SB213		X7-SB214		X7-SB215				
			X7-SS212-0001 20111110	X7-SS212-0102 20111110	X7-SS213-0001 20111110	X7-SS213-0102 20111110	X7-SS214-0001 20111110	X7-SS214-0102 20111110	X7-SS215-0001 20111110	X7-SS215-0102 20111110	X7-SS215-0102-D 20111110		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>													
<b>CARCINOGENS</b>													
BAP EQUIVALENT-HALFND	NC	NC	0.0048	0.0041 U	0.0300	0.0040 U	35.0757	0.0037 U	0.0055	0.0042 U	0.0042 U		
BAP EQUIVALENT-POS	NC	NC	0.0005	0.0041 U	0.0300	0.0040 U	35.0757	0.0037 U	0.0034	0.0042 U	0.0042 U		
BENZO(A)ANTHRACENE	NC	NC	0.0041 U	0.0041 U	0.0146	0.0040 U	24.0000	0.0037 U	0.0029 J	0.0042 U	0.0042 U		
BENZO(A)PYRENE	NC	NC	0.0041 U	0.0041 U	0.0174	0.0040 U	23.5000	0.0037 U	0.0026 J	0.0042 U	0.0042 U		
BENZO(B)FLUORANTHENE	NC	NC	0.0027 J	0.0041 U	0.0248	0.0040 U	30.2000	0.0037 U	0.0025 J	0.0042 U	0.0042 U		
BENZO(K)FLUORANTHENE	NC	NC	0.0041 U	0.0041 U	0.0093	0.0040 U	12.8000	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
CHRYSENE	NC	NC	0.0041 U	0.0041 U	0.0189	0.0040 U	27.7000	0.0037 U	0.0021 J	0.0042 U	0.0042 U		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0041 U	0.0041 U	0.0066 J	0.0040 U	4.0800	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0023 J	0.0041 U	0.0195	0.0040 U	19.2000	0.0037 U	0.0028 J	0.0042 U	0.0042 U		
<b>NON-CARCINOGENS</b>													
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0041 U	0.0041 U	0.0040 U	0.0777 J	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0041 U	0.0041 U	0.0040 U	0.1020	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
ACENAPHTHENE	3400	33000	0.0041 U	0.0041 U	0.0041 U	0.0040 U	0.5350	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0041 U	0.0041 U	0.0040 U	0.0394 U	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
ANTHRACENE	17000	170000	0.0041 U	0.0041 U	0.0041 U	0.0040 U	0.7190	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
BENZO(G,H,I)PERYLENE	--	--	0.0029 J	0.0041 U	0.0191	0.0040 U	18.8000	0.0037 U	0.0026 J	0.0042 U	0.0042 U		
FLUORANTHENE	2300	22000	0.0041 U	0.0041 U	0.0183	0.0040 U	23.2000	0.0037 U	0.0027 J	0.0042 U	0.0042 U		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0041 U	0.0041 U	0.0041 U	0.0040 U	0.3030	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
NAPHTHALENE	3.6	18	0.0041 U	0.0041 U	0.0041 U	0.0040 U	0.3090	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
PHENANTHRENE	--	--	0.0041 U	0.0041 U	0.0053 J	0.0040 U	3.7300	0.0037 U	0.0042 U	0.0042 U	0.0042 U		
PYRENE	1700	17000	0.0041 U	0.0041 U	0.0183	0.0040 U	24.2000	0.0037 U	0.0026 J	0.0042 U	0.0042 U		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UU - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB216		X7-SB217		X7-SB218		X7-SB219			
			X7-SS216-0001 20111110	X7-SS216-0102 20111110	X7-SS217-0001 20111110	X7-SS217-0102 20111110	X7-SS218-0001 20111110	X7-SS218-0102 20111110	X7-SS219-0001 20111110	X7-SS219-0102 20111110		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.0043 U	0.0040 U	1.4685	0.0498	1.4477	0.0092	0.1290	0.0039 U		
BAP EQUIVALENT-POS	NC	NC	0.0043 U	0.0040 U	1.4685	0.0498	1.4477	0.0072	0.1290	0.0039 U		
BENZO(A)ANTHRACENE	NC	NC	0.0043 U	0.0040 U	0.9070	0.0280	0.8620	0.0043 J	0.0657	0.0039 U		
BENZO(A)PYRENE	NC	NC	0.0043 U	0.0040 U	0.9680	0.0324	0.9580	0.0056 J	0.0872	0.0039 U		
BENZO(B)FLUORANTHENE	NC	NC	0.0043 U	0.0040 U	1.2600	0.0444	1.3600	0.0064 J	0.1150	0.0039 U		
BENZO(K)FLUORANTHENE	NC	NC	0.0043 U	0.0040 U	0.5130	0.0161	0.4060	0.0031 J	0.0492	0.0039 U		
CHRYSENE	NC	NC	0.0043 U	0.0040 U	1.2000	0.0365	1.1700	0.0056 J	0.0921	0.0039 U		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0043 U	0.0040 U	0.1910	0.0069 J	0.1780	0.0040 U	0.0151	0.0039 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0043 U	0.0040 U	0.8650	0.0307	0.8430	0.0051 J	0.0802	0.0039 U		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0043 U	0.0040 U	0.0050 J	0.0041 U	0.0051 J	0.0040 U	0.0040 U	0.0039 U		
2-METHYLNAPHTHALENE	230	2200	0.0043 U	0.0040 U	0.0057 J	0.0041 U	0.0061 J	0.0040 U	0.0040 U	0.0039 U		
ACENAPHTHENE	3400	33000	0.0043 U	0.0040 U	0.0326	0.0041 U	0.0300	0.0040 U	0.0032 J	0.0039 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0043 U	0.0040 U	0.0040 U	0.0041 U	0.0042 U	0.0040 U	0.0040 U	0.0039 U		
ANTHRACENE	17000	170000	0.0043 U	0.0040 U	0.0434	0.0021 J	0.0387	0.0040 U	0.0045 J	0.0039 U		
BENZO(G,H,I)PERYLENE	--	--	0.0043 U	0.0040 U	0.8930	0.0322	0.8520	0.0057 J	0.0821	0.0039 U		
FLUORANTHENE	2300	22000	0.0043 U	0.0040 U	1.0700	0.0334	1.0000	0.0060 J	0.0927	0.0039 U		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0043 U	0.0040 U	0.0166	0.0041 U	0.0151	0.0040 U	0.0040 U	0.0039 U		
NAPHTHALENE	3.6	18	0.0043 U	0.0040 U	0.0204	0.0041 U	0.0200	0.0040 U	0.0040 U	0.0039 U		
PHENANTHRENE	--	--	0.0043 U	0.0040 U	0.2390	0.0092	0.2170	0.0029 J	0.0248	0.0039 U		
PYRENE	1700	17000	0.0043 U	0.0040 U	1.0900	0.0336	1.0300	0.0055 J	0.0926	0.0039 U		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent



J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB220		X7-SB221		X7-SB222		X7-SB223			
			X7-SS220-0001 20111110	X7-SS220-0102 20111110	X7-SS221-0001 20111110	X7-SS221-0102 20111110	X7-SS222-0001 20111110	X7-SS222-0001-D 20111110	X7-SS222-0102 20111110	X7-SS223-0001 20111110	X7-SS223-0102 20111110	
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.2844	0.0100	0.0047	0.0040 U	0.2461	0.3633	0.0093	0.1068	0.0063	
BAP EQUIVALENT-POS	NC	NC	0.2844	0.0079	0.0003	0.0040 U	0.2461	0.3633	0.0069	0.1068	0.0039	
BENZO(A)ANTHRACENE	NC	NC	0.1570	0.0038 U	0.0040 U	0.0040 U	0.1190 J	0.1720	0.0040 U	0.0498	0.0039 U	
BENZO(A)PYRENE	NC	NC	0.1900	0.0065 J	0.0040 U	0.0040 U	0.1680 J	0.2480	0.0062 J	0.0720	0.0035 J	
BENZO(B)FLUORANTHENE	NC	NC	0.2370	0.0087	0.0034 J	0.0040 U	0.2070 J	0.3280	0.0071 J	0.0923	0.0037 J	
BENZO(K)FLUORANTHENE	NC	NC	0.1010	0.0035 J	0.0040 U	0.0040 U	0.0796 J	0.1180	0.0038 J	0.0308	0.0039 U	
CHRYSENE	NC	NC	0.1980	0.0038 U	0.0040 U	0.0040 U	0.1510 J	0.2250	0.0040 U	0.0639	0.0039 U	
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0364	0.0038 U	0.0040 U	0.0040 U	0.0294	0.0418	0.0040 U	0.0139	0.0039 U	
INDENO(1,2,3-CD)PYRENE	NC	NC	0.1740	0.0053 J	0.0040 U	0.0040 U	0.1520 J	0.2210	0.0040 U	0.0633	0.0039 U	
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0038 U	0.0040 U	0.0040 U	0.0040 U	0.0038 U	0.0040 U	0.0041 U	0.0039 U	
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0038 U	0.0040 U	0.0040 U	0.0040 U	0.0022 J	0.0040 U	0.0021 J	0.0039 U	
ACENAPHTHENE	3400	33000	0.0094	0.0038 U	0.0040 U	0.0040 U	0.0056 J	0.0086	0.0040 U	0.0032 J	0.0039 U	
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0038 U	0.0040 U	0.0040 U	0.0040 U	0.0038 U	0.0040 U	0.0041 U	0.0039 U	
ANTHRACENE	17000	170000	0.0150	0.0038 U	0.0040 U	0.0040 U	0.0087	0.0121	0.0040 U	0.0044 J	0.0039 U	
BENZO(G,H,I)PERYLENE	--	--	0.1860	0.0060 J	0.0040 U	0.0040 U	0.1550 J	0.2290	0.0056 J	0.0670	0.0039 U	
FLUORANTHENE	2300	22000	0.2470	0.0059 J	0.0026 J	0.0040 U	0.1640 J	0.2530	0.0068 J	0.0816	0.0033 J	
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0043 J	0.0038 U	0.0040 U	0.0040 U	0.0030 J	0.0045 J	0.0040 U	0.0041 U	0.0039 U	
NAPHTHALENE	3.6	18	0.0041 U	0.0038 U	0.0040 U	0.0040 U	0.0040 U	0.0038 U	0.0040 U	0.0041 U	0.0039 U	
PHENANTHRENE	--	--	0.0848	0.0023 J	0.0040 U	0.0040 U	0.0484	0.0664	0.0040 J	0.0277	0.0026 J	
PYRENE	1700	17000	0.2410	0.0060 J	0.0027 J	0.0040 U	0.1560 J	0.2490	0.0066 J	0.0788	0.0031 J	

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB224 X7-SS224-0001 20111110	X7-SB225 X7-SS225-0001 20111110		X7-SB226 X7-SS226-0102 20111110		X7-SB227 X7-SS227-0001 20111110	X7-SB228 X7-SS228-0001 20111110	
				X7-SS225-0001 20111110	X7-SS225-0102 20111110	X7-SS226-0001 20111110	X7-SS226-0102 20111110	X7-SS227-0001 20111110	X7-SS228-0001 20111110	X7-SS228-0001 20111110
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>										
<b>CARCINOGENS</b>										
BAP EQUIVALENT-HALFND	NC	NC	0.0211	0.0563	0.0046	0.2964	0.0039 U	0.1679	0.1189	0.0129
BAP EQUIVALENT-POS	NC	NC	0.0190	0.0545	0.0005	0.2964	0.0039 U	0.1679	0.1189	0.0129
BENZO(A)ANTHRACENE	NC	NC	0.0105	0.0273	0.0038 U	0.1360	0.0039 U	0.0735	0.0553	0.0058 J
BENZO(A)PYRENE	NC	NC	0.0140	0.0423	0.0038 U	0.2000	0.0039 U	0.1110	0.0790	0.0085
BENZO(B)FLUORANTHENE	NC	NC	0.0216	0.0579	0.0030 J	0.2520	0.0039 U	0.1480	0.1020	0.0099
BENZO(K)FLUORANTHENE	NC	NC	0.0070 J	0.0183	0.0023 J	0.1010	0.0039 U	0.0489	0.0355	0.0033 J
CHRYSENE	NC	NC	0.0143	0.0367	0.0038 U	0.1650	0.0039 U	0.0994	0.0703	0.0076 J
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0042 U	0.0037 U	0.0038 U	0.0391	0.0039 U	0.0238	0.0161	0.0021 J
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0169	0.0343	0.0020 J	0.1730	0.0039 U	0.1040	0.0763	0.0073 J
<b>NON-CARCINOGENS</b>										
1-METHYLNAPHTHALENE	16	53	0.0042 U	0.0037 U	0.0038 U	0.0040 U	0.0039 U	0.0041 U	0.0041 U	0.0039 U
2-METHYLNAPHTHALENE	230	2200	0.0042 U	0.0037 U	0.0038 U	0.0040 U	0.0039 U	0.0041 U	0.0041 U	0.0039 U
ACENAPHTHENE	3400	33000	0.0042 U	0.0023 J	0.0038 U	0.0045 J	0.0039 U	0.0043 J	0.0026 J	0.0039 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0042 U	0.0037 U	0.0038 U	0.0040 U	0.0039 U	0.0041 U	0.0041 U	0.0039 U
ANTHRACENE	17000	170000	0.0042 U	0.0019 J	0.0038 U	0.0061 J	0.0039 U	0.0055 J	0.0036 J	0.0039 U
BENZO(G,H,I)PERYLENE	--	--	0.0159	0.0377	0.0038 U	0.1770	0.0039 U	0.1130	0.0821	0.0084
FLUORANTHENE	2300	22000	0.0184	0.0425	0.0022 J	0.1670	0.0039 U	0.1110	0.0776	0.0083
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0042 U	0.0037 U	0.0038 U	0.0040 U	0.0039 U	0.0025 J	0.0041 U	0.0039 U
NAPHTHALENE	3.6	18	0.0042 U	0.0037 U	0.0038 U	0.0040 U	0.0039 U	0.0041 U	0.0041 U	0.0039 U
PHENANTHRENE	--	--	0.0090	0.0132	0.0020 J	0.0311	0.0039 U	0.0322	0.0200	0.0035 J
PYRENE	1700	17000	0.0172	0.0416	0.0023 J	0.1690	0.0039 U	0.1090	0.0767	0.0078 J

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION

UXO 07

NAVAL SUPPORT ACTIVITY  
CRANE, INDIANA

8 OF 16

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB229		X7-SB230		X7-SB231	X7-SB232		X7-SB233	
			X7-SS229-0001 20111110	X7-SS229-0102 20111110	X7-SS230-0001 20111110	X7-SS230-0102 20111110	X7-SS231-0001 20111110	X7-SS232-0001 20111110	X7-SS232-0102 20111110	X7-SS233-0001 20111110	X7-SS233-0102 20111110
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>											
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFND	NC	NC	5.4938	0.0087	0.2924	0.0161	0.0100	9.0937	0.0045	0.1361	0.0038 U
BAP EQUIVALENT-POS	NC	NC	<b>5.4938</b>	0.0067	0.2924	0.0161	0.0078	<b>9.0937</b>	0.0007	0.1361	0.0038 U
BENZO(A)ANTHRACENE	NC	NC	2.7900	0.0039 J	0.1440	0.0076 J	0.0039 U	8.1100	0.0019 J	0.0683	0.0038 U
BENZO(A)PYRENE	NC	NC	3.6600	0.0051 J	0.1930	0.0101	0.0065 J	5.9300	0.0038 U	0.0901	0.0038 U
BENZO(B)FLUORANTHENE	NC	NC	4.7900	0.0063 J	0.2510	0.0140	0.0076 J	7.6200	0.0028 J	0.1210	0.0038 U
BENZO(K)FLUORANTHENE	NC	NC	1.7300	0.0024 J	0.0895	0.0050 J	0.0030 J	3.2200	0.0038 U	0.0426	0.0038 U
CHRYSENE	NC	NC	3.5200	0.0045 J	0.1760	0.0088	0.0039 U	7.4900	0.0038 U	0.0829	0.0038 U
DIBENZO(A,H)ANTHRACENE	NC	NC	0.7290	0.0041 U	0.0405	0.0028 J	0.0039 U	1.0800	0.0038 U	0.0179	0.0038 U
INDENO(1,2,3-CD)PYRENE	NC	NC	3.2600	0.0051 J	0.1830	0.0106	0.0056 J	4.7100	0.0021 J	0.0869	0.0038 U
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0259 J	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0968	0.0038 U	0.0040 U	0.0038 U
2-METHYLNAPHTHALENE	230	2200	0.0294 J	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.1390	0.0038 U	0.0040 U	0.0038 U
ACENAPHTHENE	3400	33000	0.1410	0.0041 U	0.0081 J	0.0039 U	0.0039 U	1.1800	0.0038 U	0.0032 J	0.0038 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0390 U	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0410 U	0.0038 U	0.0040 U	0.0038 U
ANTHRACENE	17000	170000	0.1470	0.0041 U	0.0095	0.0039 U	0.0039 U	3.3300	0.0038 U	0.0043 J	0.0038 U
BENZO(G,H,I)PERYLENE	--	--	3.5400	0.0053 J	0.1910	0.0121	0.0059 J	4.2500	0.0024 J	0.0883	0.0038 U
FLUORANTHENE	2300	22000	3.5700	0.0058 J	0.1850	0.0101	0.0054 J	16.4000	0.0021 J	0.0886	0.0038 U
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0733 J	0.0041 U	0.0045 J	0.0039 U	0.0039 U	1.3000	0.0038 U	0.0040 U	0.0038 U
NAPHTHALENE	3.6	18	0.0949	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.3130	0.0038 U	0.0040 U	0.0038 U
PHENANTHRENE	--	--	0.8320	0.0032 J	0.0557	0.0040 J	0.0028 J	11.3000	0.0038 U	0.0252	0.0038 U
PYRENE	1700	17000	3.6500	0.0052 J	0.1830	0.0100	0.0047 J	13.1000	0.0020 J	0.0877	0.0038 U

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
 9 OF 16

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB234		X7-SB237	X7-SB238	X7-SB239	X7-SB240		X7-SB241	
POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)			X7-SS234-0001 20111110	X7-SS234-0102 20111110	X7-SS237-0001 20111110	X7-SS238-0001 20111110	X7-SS239-0001 20111110	X7-SS240-0001 20111110	X7-SS240-0102 20111110	X7-SS241-0001 20111110	X7-SS241-0102 20111110
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFND	NC	NC	0.1377	0.0285	0.0082	0.0163	0.0144	0.0726	0.0061	0.6665	0.0328
BAP EQUIVALENT-POS	NC	NC	0.1377	0.0265	0.0058	0.0143	0.0122	0.0726	0.0042	<b>0.6665</b>	0.0328
BENZO(A)ANTHRACENE	NC	NC	0.0763 J	0.0152	0.0044 U	0.0075 J	0.0067 J	0.0379	0.0022 J	0.3420	0.0139
BENZO(A)PYRENE	NC	NC	0.0914 J	0.0203	0.0047 J	0.0112	0.0094	0.0486	0.0032 J	0.4440	0.0212
BENZO(B)FLUORANTHENE	NC	NC	0.1240 J	0.0256	0.0064 J	0.0134	0.0123	0.0621	0.0043 J	0.6240	0.0304
BENZO(K)FLUORANTHENE	NC	NC	0.0451 J	0.0096	0.0044 U	0.0057 J	0.0052 J	0.0248	0.0038 U	0.1930	0.0085
CHRYSENE	NC	NC	0.0862 J	0.0187	0.0044 U	0.0090	0.0088	0.0458	0.0027 J	0.4240	0.0174
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0175	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0091	0.0038 U	0.0845	0.0050 J
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0827 J	0.0203	0.0046 J	0.0092	0.0088	0.0459	0.0031 J	0.3900	0.0200
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0039 U	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0040 U	0.0038 U	0.0028 J	0.0041 U
2-METHYLNAPHTHALENE	230	2200	0.0039 U	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0040 U	0.0038 U	0.0034 J	0.0041 U
ACENAPHTHENE	3400	33000	0.0045 J	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0025 J	0.0038 U	0.0137	0.0041 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0039 U	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0040 U	0.0038 U	0.0039 U	0.0041 U
ANTHRACENE	17000	170000	0.0069 J	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0039 J	0.0038 U	0.0203	0.0041 U
BENZO(G,H,I)PERYLENE	--	--	0.0993 J	0.0224	0.0053 J	0.0105	0.0091	0.0492	0.0038 U	0.4060	0.0196
FLUORANTHENE	2300	22000	0.1150 J	0.0258	0.0059 J	0.0128	0.0102	0.0597	0.0034 J	0.4510	0.0192
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0039 U	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0040 U	0.0038 U	0.0072 J	0.0041 U
NAPHTHALENE	3.6	18	0.0039 U	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0040 U	0.0038 U	0.0072 J	0.0041 U
PHENANTHRENE	--	--	0.0418 J	0.0103	0.0038 J	0.0060 J	0.0054 J	0.0233	0.0021 J	0.1110	0.0059 J
PYRENE	1700	17000	0.1110 J	0.0231	0.0047 J	0.0127	0.0094	0.0580	0.0033 J	0.4510	0.0194

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UU - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB242		X7-SB243		X7-SB244		X7-SB245			
			X7-SS242-0001 20111109	X7-SS242-0102 20111109	X7-SS243-0001 20111109	X7-SS243-0102 20111109	X7-SS244-0001 20111109	X7-SS244-0102 20111109	X7-SS245-0001 20111109	X7-SS245-0102 20111109		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.2570	0.2163	0.0210	0.3438	0.0585	0.0313	0.0269	0.0492		
BAP EQUIVALENT-POS	NC	NC	0.2570	0.2163	0.0208	0.3438	0.0585	0.0313	0.0267	0.0259		
BENZO(A)ANTHRACENE	NC	NC	0.1450	0.1230	0.0041 U	0.2010	0.0341	0.0184	0.0041 U	0.0385 U		
BENZO(A)PYRENE	NC	NC	0.1750	0.1460	0.0135	0.2330	0.0391	0.0199	0.0180	0.0227 J		
BENZO(B)FLUORANTHENE	NC	NC	0.2190	0.1870	0.0201	0.2730	0.0522	0.0252	0.0263	0.0321 J		
BENZO(K)FLUORANTHENE	NC	NC	0.0934	0.0803	0.0078 J	0.1260	0.0180	0.0099	0.0097	0.0385 U		
CHRYSENE	NC	NC	0.1820	0.1540	0.0041 U	0.2530	0.0438	0.0207	0.0041 U	0.0385 U		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0296	0.0251	0.0038 J	0.0415	0.0072 J	0.0054 J	0.0041 J	0.0385 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.1490	0.1320	0.0144	0.2040	0.0335	0.0147	0.0187	0.0385 U		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0050 U	0.0038 U	0.0041 U	0.0040 U	0.0040 U	0.0040 U	0.0041 U	0.0385 U		
2-METHYLNAPHTHALENE	230	2200	0.0050 U	0.0038 U	0.0041 U	0.0040 U	0.0040 U	0.0040 U	0.0041 U	0.0385 U		
ACENAPHTHENE	3400	33000	0.0039 J	0.0048 J	0.0041 U	0.0056 J	0.0040 U	0.0040 U	0.0041 U	0.0385 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0050 U	0.0038 U	0.0041 U	0.0040 U	0.0040 U	0.0040 U	0.0041 U	0.0385 U		
ANTHRACENE	17000	170000	0.0064 J	0.0071 J	0.0041 U	0.0104	0.0040 U	0.0054 J	0.0067 J	0.0385 U		
BENZO(G,H,I)PERYLENE	--	--	0.1450	0.1300	0.0136	0.2050	0.0311	0.0175	0.0183	0.0385 U		
FLUORANTHENE	2300	22000	0.1720	0.1520	0.0142	0.1910	0.0451	0.0223	0.0206	0.0275 J		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0027 J	0.0026 J	0.0041 U	0.0039 J	0.0040 U	0.0040 U	0.0041 U	0.0385 U		
NAPHTHALENE	3.6	18	0.0050 U	0.0029 J	0.0041 U	0.0049 J	0.0040 U	0.0040 U	0.0041 U	0.0385 U		
PHENANTHRENE	--	--	0.0291	0.0321	0.0042 J	0.0405	0.0133	0.0053 J	0.0068 J	0.0385 U		
PYRENE	1700	17000	0.1720	0.1530	0.0143	0.2030	0.0430	0.0217	0.0191	0.0271 J		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB246		X7-SB247		X7-SB248		X7-SB249		
POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)			X7-SS246-0001 20111109	X7-SS246-0102 20111109	X7-SS247-0001 20111109	X7-SS247-0102 20111109	X7-SS248-0001 20111109	X7-SS248-0001-D 20111109	X7-SS248-0102 20111109	X7-SS249-0001 20111109	X7-SS249-0102 20111109
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFND	NC	NC	0.0404	0.1050	0.1532	5.6961	0.0085	0.0064	0.0414 U	0.0130	0.0266
BAP EQUIVALENT-POS	NC	NC	0.0404	0.1050	0.1532	5.6961	0.0065	0.0042	0.0414 U	0.0107	0.0264
BENZO(A)ANTHRACENE	NC	NC	0.0176	0.0594	0.0870	3.0700	0.0037 J	0.0040 U	0.0414 U	0.0042 U	0.0039 U
BENZO(A)PYRENE	NC	NC	0.0268	0.0708	0.1030	3.8600	0.0050 J	0.0035 J	0.0414 U	0.0088	0.0189
BENZO(B)FLUORANTHENE	NC	NC	0.0347	0.0894	0.1360	5.3600	0.0067 J	0.0044 J	0.0414 U	0.0101	0.0270
BENZO(K)FLUORANTHENE	NC	NC	0.0147	0.0350	0.0503	1.7900	0.0025 J	0.0033 J	0.0414 U	0.0052 J	0.0125
CHRYSENE	NC	NC	0.0208	0.0683	0.1020	4.1700	0.0053 J	0.0040 U	0.0414 U	0.0042 U	0.0039 U
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0056 J	0.0128	0.0182	0.6430	0.0041 U	0.0040 U	0.0414 U	0.0042 U	0.0030 J
INDENO(1,2,3-C,D)PYRENE	NC	NC	0.0261	0.0611	0.0906	3.2800	0.0044 J	0.0030 J	0.0414 U	0.0082 J	0.0171
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0040 U	0.0039 U	0.0041 U	0.0385 U	0.0041 U	0.0040 U	0.0414 U	0.0042 U	0.0039 U
2-METHYLNAPHTHALENE	230	2200	0.0040 U	0.0039 U	0.0041 U	0.0385 U	0.0041 U	0.0040 U	0.0414 U	0.0042 U	0.0039 U
ACENAPHTHENE	3400	33000	0.0040 U	0.0039 U	0.0021 J	0.0932	0.0041 U	0.0040 U	0.0414 U	0.0042 U	0.0039 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0040 U	0.0039 U	0.0041 U	0.0385 U	0.0041 U	0.0040 U	0.0414 U	0.0042 U	0.0039 U
ANTHRACENE	17000	170000	0.0040 U	0.0024 J	0.0049 J	0.1980	0.0041 U	0.0040 U	0.0414 U	0.0022 J	0.0039 U
BENZO(G,H,I)PERYLENE	--	--	0.0255	0.0619	0.0851	3.5000	0.0054 J	0.0037 J	0.0414 U	0.0087	0.0164
FLUORANTHENE	2300	22000	0.0236	0.0688	0.1090	4.2200	0.0069 J	0.0050 J	0.0414 U	0.0093	0.0232
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0040 U	0.0039 U	0.0041 U	0.0385 U	0.0041 U	0.0040 U	0.0414 U	0.0042 U	0.0039 U
NAPHTHALENE	3.6	18	0.0040 U	0.0039 U	0.0041 U	0.0589 J	0.0041 U	0.0040 U	0.0414 U	0.0042 U	0.0039 U
PHENANTHRENE	--	--	0.0040 U	0.0118	0.0224	0.9330	0.0041 U	0.0034 J	0.0414 U	0.0049 J	0.0067 J
PYRENE	1700	17000	0.0229	0.0685	0.1080	4.1800	0.0065 J	0.0046 J	0.0414 U	0.0092	0.0219

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UU - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB250			X7-SB251			X7-SB252		X7-SB253	
			X7-SS250-0001 20111109	X7-SS250-0001-D 20111109	X7-SS250-0102 20111109	X7-SS251-0001 20111109	X7-SS251-0102 20111109	X7-SS252-0001 20111109	X7-SS252-0102 20111109	X7-SS253-0001 20111109	X7-SS253-0102 20111109	
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.0089	0.0134	0.1319	0.0189	0.0196	0.0117	0.0362	0.0094	0.0629	
BAP EQUIVALENT-POS	NC	NC	0.0068	0.0113	0.1319	0.0189	0.0196	0.0095	0.0342	0.0067	0.0629	
BENZO(A)ANTHRACENE	NC	NC	0.0039 U	0.0067 J	0.0724	0.0091	0.0086	0.0041 U	0.0211	0.0040 U	0.0291	
BENZO(A)PYRENE	NC	NC	0.0053 J	0.0087	0.0904	0.0117	0.0115	0.0077 J	0.0258	0.0067 J	0.0426	
BENZO(B)FLUORANTHENE	NC	NC	0.0082	0.0119	0.1130	0.0147	0.0185	0.0102	0.0362	0.0040 U	0.0525	
BENZO(K)FLUORANTHENE	NC	NC	0.0043 J	0.0048 J	0.0456	0.0074 J	0.0057 J	0.0049 J	0.0161	0.0040 U	0.0200	
CHRYSENE	NC	NC	0.0039 U	0.0090	0.0891	0.0121	0.0116	0.0041 U	0.0239	0.0040 U	0.0358	
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0039 U	0.0041 U	0.0146	0.0036 J	0.0040 J	0.0041 U	0.0041 U	0.0040 U	0.0082	
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0059 J	0.0072 J	0.0786	0.0106	0.0137	0.0076 J	0.0244	0.0040 U	0.0373	
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0039 U	0.0041 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0040 U	
2-METHYLNAPHTHALENE	230	2200	0.0039 U	0.0041 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0040 U	
ACENAPHTHENE	3400	33000	0.0039 U	0.0041 U	0.0024 J	0.0042 U	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0040 U	
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0039 U	0.0041 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0040 U	
ANTHRACENE	17000	170000	0.0039 U	0.0041 U	0.0048 J	0.0042 U	0.0040 U	0.0041 U	0.0041 U	0.0021 J	0.0026 J	
BENZO(G,H,I)PERYLENE	--	--	0.0061 J	0.0072 J	0.0753	0.0108	0.0118	0.0075 J	0.0260	0.0051 J	0.0343	
FLUORANTHENE	2300	22000	0.0104	0.0100	0.0887	0.0124	0.0126	0.0078 J	0.0272	0.0084	0.0329	
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0039 U	0.0041 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0040 U	
NAPHTHALENE	3.6	18	0.0039 U	0.0041 U	0.0040 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0040 U	
PHENANTHRENE	--	--	0.0086	0.0044 J	0.0219	0.0042 J	0.0060 J	0.0038 J	0.0052 J	0.0048 J	0.0066 J	
PYRENE	1700	17000	0.0084	0.0095	0.0881	0.0115	0.0120	0.0076 J	0.0281	0.0073 J	0.0335	

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent



J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION

UXO 07

NAVAL SUPPORT ACTIVITY

CRANE, INDIANA

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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB254		X7-SB255		X7-SB256		X7-SB257		
POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)			X7-SS254-0001 20111109	X7-SS254-0102 20111109	X7-SS255-0001 20111109	X7-SS255-0102 20111109	X7-SS256-0001 20111109	X7-SS256-0102 20111109	X7-SS257-0001 20111109	X7-SS257-0001-D 20111109	X7-SS257-0102 20111109
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFND	NC	NC	0.6998	0.2654	1.7376	9.4851	0.0278	0.1665	0.0359	0.0536	0.3454
BAP EQUIVALENT-POS	NC	NC	0.6998	0.2654	1.7376	9.4851	0.0278	0.1665	0.0359	0.0536	0.3454
BENZO(A)ANTHRACENE	NC	NC	0.4090	0.1520	1.1200	5.8800	0.0162	0.1040	0.0185	0.0236	0.2030
BENZO(A)PYRENE	NC	NC	0.4880	0.1820	1.2200	6.5500	0.0178	0.1120	0.0243	0.0364	0.2380 J
BENZO(B)FLUORANTHENE	NC	NC	0.6390	0.2450	1.5800	8.0800	0.0246	0.1490	0.0328	0.0439	0.3120 J
BENZO(K)FLUORANTHENE	NC	NC	0.2400	0.0876	0.6890	3.2000	0.0084	0.0545	0.0119	0.0151	0.1150 J
CHRYSENE	NC	NC	0.4990	0.1820	1.2100	7.1000	0.0203	0.1290	0.0236	0.0293	0.2490 J
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0691	0.0287	0.1600	1.0300	0.0044 J	0.0204	0.0044 J	0.0069 J	0.0363
INDENO(1,2,3-C,D)PYRENE	NC	NC	0.3500	0.1390	0.7950	4.7000	0.0145	0.0808	0.0195	0.0341	0.1820 J
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0039 U	0.0049 J	0.0382 U	0.0042 U	0.0041 U	0.0042 U	0.0040 U	0.0042 U
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0039 U	0.0076 J	0.0382 U	0.0042 U	0.0041 U	0.0042 U	0.0040 U	0.0042 U
ACENAPHTHENE	3400	33000	0.0068 J	0.0038 J	0.0283	0.1190	0.0042 U	0.0030 J	0.0042 U	0.0040 U	0.0044 J
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0039 U	0.0040 U	0.0382 U	0.0042 U	0.0041 U	0.0042 U	0.0040 U	0.0042 U
ANTHRACENE	17000	170000	0.0114	0.0055 J	0.0381	0.2130	0.0042 U	0.0051 J	0.0042 U	0.0030 J	0.0069 J
BENZO(G,H,I)PERYLENE	--	--	0.3310	0.1360	0.7130	4.3200	0.0162	0.0812	0.0214	0.0330	0.1750 J
FLUORANTHENE	2300	22000	0.4280	0.1710	1.2000	7.2600	0.0182	0.1120	0.0229	0.0341	0.2130 J
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0036 J	0.0039 U	0.0138	0.0382 U	0.0042 U	0.0041 U	0.0042 U	0.0040 U	0.0027 J
NAPHTHALENE	3.6	18	0.0041 U	0.0039 U	0.0331	0.0582 J	0.0042 U	0.0041 U	0.0042 U	0.0040 U	0.0042 U
PHENANTHRENE	--	--	0.0598	0.0257	0.1790	1.1200	0.0056 J	0.0224	0.0054 J	0.0090	0.0315
PYRENE	1700	17000	0.4550	0.1780	1.2300	7.3600	0.0180	0.1120	0.0237	0.0324	0.2250 J

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylen; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
 14 OF 16

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB258		X7-SB259		X7-SB260		X7-SB261			
			X7-SS258-0001 20111109	X7-SS258-0102 20111109	X7-SS259-0001 20111109	X7-SS259-0102 20111109	X7-SS260-0001 20111109	X7-SS260-0102 20111109	X7-SS261-0001 20111109	X7-SS261-0102 20111109		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.0103	0.0042 U	0.0044 U	0.0042 U	0.0122	0.1475	0.0298	0.2931		
BAP EQUIVALENT-POS	NC	NC	0.0078	0.0042 U	0.0044 U	0.0042 U	0.0121	0.1475	0.0298	0.2931		
BENZO(A)ANTHRACENE	NC	NC	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0786	0.0173	0.1240		
BENZO(A)PYRENE	NC	NC	0.0062 J	0.0042 U	0.0044 U	0.0042 U	0.0076	0.0997	0.0199	0.1910		
BENZO(B)FLUORANTHENE	NC	NC	0.0100	0.0042 U	0.0044 U	0.0042 U	0.0119	0.1390	0.0281	0.2620		
BENZO(K)FLUORANTHENE	NC	NC	0.0037 J	0.0042 U	0.0044 U	0.0042 U	0.0043 J	0.0483	0.0108	0.0916		
CHRYSENE	NC	NC	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0973	0.0216	0.1710		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0026 J	0.0176	0.0036 J	0.0452 J		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0065 J	0.0042 U	0.0044 U	0.0042 U	0.0065 J	0.0781	0.0167	0.1720		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0040 U	0.0040 U	0.0395 U		
2-METHYLNAPHTHALENE	230	2200	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0040 U	0.0040 U	0.0395 U		
ACENAPHTHENE	3400	33000	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0027 J	0.0040 U	0.0395 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0040 U	0.0040 U	0.0395 U		
ANTHRACENE	17000	170000	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0047 J	0.0040 U	0.0395 U		
BENZO(G,H,I)PERYLENE	--	--	0.0062 J	0.0042 U	0.0044 U	0.0042 U	0.0071 J	0.0760	0.0161	0.1560		
FLUORANTHENE	2300	22000	0.0078 J	0.0042 U	0.0044 U	0.0042 U	0.0090	0.0889	0.0199	0.1580		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0020 J	0.0040 U	0.0395 U		
NAPHTHALENE	3.6	18	0.0045 U	0.0042 U	0.0044 U	0.0042 U	0.0038 U	0.0040 U	0.0040 U	0.0395 U		
PHENANTHRENE	--	--	0.0029 J	0.0042 U	0.0044 U	0.0042 U	0.0038 J	0.0199	0.0044 J	0.0282 J		
PYRENE	1700	17000	0.0072 J	0.0042 U	0.0044 U	0.0042 U	0.0086	0.0903	0.0204	0.1590		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent



J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
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LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB262		X7-SB263		X7-SB265		X7-SB266			
			X7-SS262-0001 20111109	X7-SS262-0102 20111109	X7-SS263-0001 20111109	X7-SS263-0102 20111109	X7-SS265-0001 20111109	X7-SS265-0102 20111109	X7-SS266-0001 20111109	X7-SS266-0102 20111109		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.4981	0.0902	0.4152	0.0058	0.0184	0.0058	0.0135	0.0428		
BAP EQUIVALENT-POS	NC	NC	0.4981	0.0902	0.4152	0.0037	0.0162	0.0033	0.0115	0.0428		
BENZO(A)ANTHRACENE	NC	NC	0.3000	0.0458	0.2480	0.0039 U	0.0041 U	0.0042 U	0.0064 J	0.0201		
BENZO(A)PYRENE	NC	NC	0.3450	0.0604	0.2830	0.0031 J	0.0133	0.0029 J	0.0089	0.0269		
BENZO(B)FLUORANTHENE	NC	NC	0.4730	0.0814	0.3720	0.0035 J	0.0189	0.0047 J	0.0126	0.0406		
BENZO(K)FLUORANTHENE	NC	NC	0.1690	0.0283	0.1330	0.0020 J	0.0065 J	0.0042 U	0.0050 J	0.0158		
CHRYSENE	NC	NC	0.3620	0.0594	0.3000	0.0039 U	0.0041 U	0.0042 U	0.0078 J	0.0264		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0493	0.0112	0.0468	0.0039 U	0.0041 U	0.0042 U	0.0041 U	0.0073 J		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.2440	0.0557	0.2180	0.0028 J	0.0092	0.0042 U	0.0058 J	0.0239		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0040 U	0.0039 U	0.0039 U	0.0041 U	0.0042 U	0.0041 U	0.0040 U		
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0040 U	0.0039 U	0.0039 U	0.0041 U	0.0042 U	0.0041 U	0.0040 U		
ACENAPHTHENE	3400	33000	0.0077 J	0.0040 U	0.0059 J	0.0039 U	0.0041 U	0.0042 U	0.0041 U	0.0040 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0040 U	0.0039 U	0.0039 U	0.0041 U	0.0042 U	0.0041 U	0.0040 U		
ANTHRACENE	17000	170000	0.0115	0.0028 J	0.0119	0.0039 U	0.0041 U	0.0042 U	0.0041 U	0.0040 U		
BENZO(G,H,I)PERYLENE	--	--	0.2290	0.0525	0.2180	0.0027 J	0.0098	0.0022 J	0.0067 J	0.0225		
FLUORANTHENE	2300	22000	0.3360	0.0544	0.3010	0.0029 J	0.0199	0.0064 J	0.0087	0.0237		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0039 J	0.0040 U	0.0037 J	0.0039 U	0.0041 U	0.0042 U	0.0041 U	0.0040 U		
NAPHTHALENE	3.6	18	0.0041 U	0.0040 U	0.0039 U	0.0039 U	0.0041 U	0.0042 U	0.0041 U	0.0040 U		
PHENANTHRENE	--	--	0.0549	0.0113	0.0559	0.0039 U	0.0090	0.0061 J	0.0033 J	0.0044 J		
PYRENE	1700	17000	0.3450	0.0551	0.3010	0.0028 J	0.0183	0.0046 J	0.0082 J	0.0229		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.



Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

TABLE 6b

ANALYTICAL DATA FOR PAHS - FULL APPENDIX  
 2011 RFI ADDENDUM - ROUND 1 SAMPLE COLLECTION  
 UXO 07  
 NAVAL SUPPORT ACTIVITY  
 CRANE, INDIANA  
 16 OF 16

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB267			X7-SB270			X7-SB271			X7-SB272			
			X7-SS267-0001 20111109	X7-SS267-0102 20111109	X7-SS270-0001 20111109	X7-SS270-0102 20111109	X7-SS270-0102-D 20111109	X7-SS271-0001 20111109	X7-SS271-0102 20111109	X7-SS272-0001 20111109	X7-SS272-0102 20111109	X7-SS272-0001 20111109	X7-SS272-0102 20111109		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>															
<b>CARCINOGENS</b>															
BAP EQUIVALENT-HALFND	NC	NC	0.0139	0.0222	0.0118	0.0040 U	0.0039 U	0.0834	0.1533	0.1396	0.1771				
BAP EQUIVALENT-POS	NC	NC	0.0117	0.0222	0.0098	0.0040 U	0.0039 U	0.0834	0.1533	0.1396	0.1771				
BENZO(A)ANTHRACENE	NC	NC	0.0040 U	0.0117	0.0064 J	0.0040 U	0.0039 U	0.0414	0.0832	0.0743	0.0974				
BENZO(A)PYRENE	NC	NC	0.0096	0.0141	0.0076 J	0.0040 U	0.0039 U	0.0559	0.1060	0.0932	0.1210				
BENZO(B)FLUORANTHENE	NC	NC	0.0136	0.0185	0.0095	0.0040 U	0.0039 U	0.0790	0.1450	0.1310	0.1630				
BENZO(K)FLUORANTHENE	NC	NC	0.0056 J	0.0079 J	0.0046 J	0.0040 U	0.0039 U	0.0279	0.0546	0.0488	0.0641				
CHRYSENE	NC	NC	0.0040 U	0.0129	0.0077 J	0.0040 U	0.0039 U	0.0547	0.1020	0.0935	0.1170				
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0040 U	0.0038 J	0.0041 U	0.0040 U	0.0039 U	0.0106	0.0162	0.0181	0.0210				
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0072 J	0.0117	0.0059 J	0.0040 U	0.0039 U	0.0449	0.0766	0.0716	0.0831				
<b>NON-CARCINOGENS</b>															
1-METHYLNAPHTHALENE	16	53	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0039 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U				
2-METHYLNAPHTHALENE	230	2200	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0039 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U				
ACENAPHTHENE	3400	33000	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0039 U	0.0042 U	0.0030 J	0.0028 J	0.0027 J				
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0039 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U				
ANTHRACENE	17000	170000	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0039 U	0.0042 U	0.0040 J	0.0040 J	0.0054 J				
BENZO(G,H,I)PERYLENE	--	--	0.0069 J	0.0119	0.0059 J	0.0040 U	0.0039 U	0.0412	0.0723	0.0691	0.0860				
FLUORANTHENE	2300	22000	0.0090	0.0132	0.0098	0.0040 U	0.0039 U	0.0491	0.0961	0.0865	0.1140				
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0039 U	0.0042 U	0.0040 U	0.0021 J	0.0041 U				
NAPHTHALENE	3.6	18	0.0040 U	0.0041 U	0.0041 U	0.0040 U	0.0039 U	0.0042 U	0.0040 U	0.0041 U	0.0041 U				
PHENANTHRENE	--	--	0.0032 J	0.0041 J	0.0048 J	0.0040 U	0.0039 U	0.0095	0.0169	0.0215	0.0208				
PYRENE	1700	17000	0.0090	0.0130	0.0084	0.0040 U	0.0039 U	0.0488	0.0975	0.0839	0.1160				

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for BaP equivalent

J - Estimated concentrations

U - Concentration is less than the laboratory detection limit

UU - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**1 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB075		X7-SB116		X7-SB121		X7-SB123	
			X7-SB075-0204 20120906	X7-SB075-0406 20120906	X7-SB116-0204 20120907	X7-SB116-0406 20120907	X7-SB121-0204 20120907	X7-SB121-0406 20120907	X7-SB123-0204 20120907	X7-SB123-0406 20120907
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>										
<b>CARCINOGENS</b>										
BAP EQUIVALENT-HALFND	NC	NC	0.0037 U	0.0046	0.1335	0.0051	0.0036 U	0.0045 U	0.0042 U	0.0040 U
BAP EQUIVALENT-POS	NC	NC	0.0037 U	0.0022	0.1317	0.0027	0.0036 U	0.0045 U	0.0042 U	0.0040 U
BENZO(A)ANTHRACENE	NC	NC	0.0037 U	0.0040 U	0.0698	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
BENZO(A)PYRENE	NC	NC	0.0037 U	0.0020 J	0.1050	0.0024 J	0.0036 U	0.0045 U	0.0042 U	0.0040 U
BENZO(B)FLUORANTHENE	NC	NC	0.0037 U	0.0024 J	0.1320	0.0032 J	0.0036 U	0.0045 U	0.0042 U	0.0040 U
BENZO(K)FLUORANTHENE	NC	NC	0.0037 U	0.0040 U	0.0457	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
CHRYSENE	NC	NC	0.0037 U	0.0040 U	0.0817	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0037 U	0.0040 U	0.0036 U	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0037 U	0.0040 U	0.0598	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
<b>NON-CARCINOGENS</b>										
1-METHYLNAPHTHALENE	16	53	0.0037 U	0.0040 U	0.0036 U	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
2-METHYLNAPHTHALENE	230	2200	0.0037 U	0.0040 U	0.0036 U	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
ACENAPHTHENE	3400	33000	0.0037 U	0.0040 U	0.0036 U	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0037 U	0.0040 U	0.0036 U	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
ANTHRACENE	17000	170000	0.0037 U	0.0040 U	0.0029 J	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
BENZO(G,H,I)PERYLENE	--	--	0.0037 U	0.0040 U	0.0670	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
FLUORANTHENE	2300	22000	0.0037 U	0.0040 U	0.0835	0.0028 J	0.0036 U	0.0045 U	0.0042 U	0.0040 U
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0037 U	0.0040 U	0.0036 U	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
NAPHTHALENE	3.6	18	0.0022 U	0.0024 U	0.0022 U	0.0024 U	0.0022 U	0.0027 U	0.0025 U	0.0024 U
PHENANTHRENE	--	--	0.0037 U	0.0040 U	0.0140	0.0040 U	0.0036 U	0.0045 U	0.0042 U	0.0040 U
PYRENE	1700	17000	0.0037 U	0.0040 U	0.0810	0.0028 J	0.0036 U	0.0045 U	0.0042 U	0.0040 U

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**2 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB203		X7-SB227		X7-SB242		X7-SB243			
			X7-SB203-0204 20120907	X7-SB203-0406 20120907	X7-SB227-0204 20120907	X7-SB227-0406 20120907	X7-SB242-0204 20120906	X7-SB242-0406 20120906	X7-SB243-0204 20120906	X7-SB243-0406 20120906		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFD	NC	NC	0.0057	0.0096	0.0037 U	0.0040 U	0.0558	0.0041 U	18.4455	0.0840		
BAP EQUIVALENT-POS	NC	NC	0.0030	0.0076	0.0037 U	0.0040 U	0.0538	0.0041 U	<b>18.4362</b>	0.0821		
BENZO(A)ANTHRACENE	NC	NC	0.0044 U	0.0069 J	0.0037 U	0.0040 U	0.0326	0.0041 U	10.3000	0.0471		
BENZO(A)PYRENE	NC	NC	0.0027 J	0.0057 J	0.0037 U	0.0040 U	0.0427	0.0041 U	14.7000	0.0649		
BENZO(B)FLUORANTHENE	NC	NC	0.0036 J	0.0085	0.0037 U	0.0040 U	0.0505	0.0041 U	18.4000	0.0843		
BENZO(K)FLUORANTHENE	NC	NC	0.0044 U	0.0029 J	0.0037 U	0.0040 U	0.0199	0.0041 U	6.1600	0.0289		
CHRYSENE	NC	NC	0.0044 U	0.0045 J	0.0037 U	0.0040 U	0.0334	0.0041 U	12.6000	0.0570		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0044 U	0.0041 U	0.0037 U	0.0040 U	0.0041 U	0.0041 U	0.0186 U	0.0040 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0044 U	0.0033 J	0.0037 U	0.0040 U	0.0256	0.0041 U	7.9200	0.0368		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0044 U	0.0041 U	0.0037 U	0.0040 U	0.0041 U	0.0041 U	0.0223 J	0.0040 U		
2-METHYLNAPHTHALENE	230	2200	0.0044 U	0.0041 U	0.0037 U	0.0040 U	0.0041 U	0.0041 U	0.0315 J	0.0040 U		
ACENAPHTHENE	3400	33000	0.0044 U	0.0041 U	0.0037 U	0.0040 U	0.0041 U	0.0041 U	0.2170	0.0040 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0044 U	0.0041 U	0.0037 U	0.0040 U	0.0041 U	0.0041 U	0.0186 U	0.0040 U		
ANTHRACENE	17000	170000	0.0044 U	0.0041 U	0.0037 U	0.0040 U	0.0041 U	0.0041 U	0.3470	0.0040 U		
BENZO(G,H,I)PERYLENE	--	--	0.0044 U	0.0037 J	0.0037 U	0.0040 U	0.0305	0.0041 U	9.1100	0.0444		
FLUORANTHENE	2300	22000	0.0031 J	0.0049 J	0.0037 U	0.0040 U	0.0350	0.0041 U	11.6000	0.0495		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0044 U	0.0041 U	0.0037 U	0.0040 U	0.0041 U	0.0041 U	0.0928	0.0040 U		
NAPHTHALENE	3.6	18	0.0027 U	0.0024 U	0.0022 U	0.0024 U	0.0024 U	0.0024 U	0.1150	0.0024 U		
PHENANTHRENE	--	--	0.0044 U	0.0041 U	0.0037 U	0.0040 U	0.0049 J	0.0041 U	1.5400	0.0063 J		
PYRENE	1700	17000	0.0027 J	0.0049 J	0.0037 U	0.0040 U	0.0326	0.0041 U	10.7000	0.0471		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**3 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB247		X7-SB254		X7-SB255		X7-SB256		
			X7-SB247-0204 20120906	X7-SB247-0406 20120906	X7-SB254-0204 20120906	X7-SB254-0406 20120906	X7-SB255-0204 20120906	X7-SB255-0204-D 20120906	X7-SB255-0406 20120906	X7-SB256-0204 20120906	X7-SB256-0406 20120906
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>											
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFD	NC	NC	0.0059	0.0040 U	0.0753	0.0040 U	1.4774	0.3377	0.0055	0.2771	0.0039 U
BAP EQUIVALENT-POS	NC	NC	0.0057	0.0040 U	0.0735	0.0040 U	<b>1.4755</b>	0.3359	0.0029	0.2753	0.0039 U
BENZO(A)ANTHRACENE	NC	NC	0.0036 U	0.0040 U	0.0417	0.0040 U	0.7290 J	0.1700 J	0.0043 U	0.1440	0.0039 U
BENZO(A)PYRENE	NC	NC	0.0029 J	0.0040 U	0.0580	0.0040 U	1.1800 J	0.2670 J	0.0026 J	0.2180	0.0039 U
BENZO(B)FLUORANTHENE	NC	NC	0.0029 J	0.0040 U	0.0731	0.0040 U	1.4500 J	0.3500 J	0.0034 J	0.2810	0.0039 U
BENZO(K)FLUORANTHENE	NC	NC	0.0036 U	0.0040 U	0.0244	0.0040 U	0.4670 J	0.1300 J	0.0043 U	0.0800	0.0039 U
CHRYSENE	NC	NC	0.0036 U	0.0040 U	0.0517	0.0040 U	0.9640 J	0.2060 J	0.0043 U	0.1800	0.0039 U
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0022 J	0.0040 U	0.0037 U	0.0040 U	0.0037 U	0.0036 U	0.0043 U	0.0036 U	0.0039 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0033 J	0.0040 U	0.0369	0.0040 U	0.7200 J	0.1540 J	0.0043 U	0.1380	0.0039 U
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0036 U	0.0040 U	0.0037 U	0.0040 U	0.0022 J	0.0036 U	0.0043 U	0.0036 U	0.0039 U
2-METHYLNAPHTHALENE	230	2200	0.0036 U	0.0040 U	0.0037 U	0.0040 U	0.0037 J	0.0036 U	0.0043 U	0.0036 U	0.0039 U
ACENAPHTHENE	3400	33000	0.0036 U	0.0040 U	0.0037 U	0.0040 U	0.0202 J	0.0036 J	0.0043 U	0.0026 J	0.0039 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0036 U	0.0040 U	0.0037 U	0.0040 U	0.0037 U	0.0036 U	0.0043 U	0.0036 U	0.0039 U
ANTHRACENE	17000	170000	0.0036 U	0.0040 U	0.0033 J	0.0040 U	0.0265 J	0.0054 J	0.0043 U	0.0047 J	0.0039 U
BENZO(G,H,I)PERYLENE	--	--	0.0036 J	0.0040 U	0.0443	0.0040 U	0.8870 J	0.1810 J	0.0026 J	0.1640	0.0039 U
FLUORANTHENE	2300	22000	0.0018 J	0.0040 U	0.0476	0.0040 U	0.8010 J	0.1830 J	0.0043 U	0.1680	0.0039 U
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0036 U	0.0040 U	0.0037 U	0.0040 U	0.0142	0.0029 J	0.0043 U	0.0036 U	0.0039 U
NAPHTHALENE	3.6	18	0.0022 U	0.0024 U	0.0022 U	0.0024 U	0.0090	0.0022 U	0.0026 U	0.0022 U	0.0023 U
PHENANTHRENE	--	--	0.0036 U	0.0040 U	0.0159	0.0040 U	0.1290 J	0.0273 J	0.0043 U	0.0276	0.0039 U
PYRENE	1700	17000	0.0036 U	0.0040 U	0.0432	0.0040 U	0.7210 J	0.1920 J	0.0043 U	0.1570	0.0039 U

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UU - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**4 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB261		X7-SB439		X7-SB441		X7-SB442		
			X7-SB261-0204 20120906	X7-SB261-0406 20120906	X7-SS439-0001 20120907	X7-SS439-0102 20120907	X7-SS441-0001 20121003	X7-SS441-0102 20121003	X7-SS442-0001 20121003	X7-SS442-0001-D 20121003	X7-SS442-0102 20121003
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>											
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFND	NC	NC	0.0044	0.0307	0.0041 U	0.0039 U	0.3728	0.0042 U	0.1561	0.0908	0.0040 U
BAP EQUIVALENT-POS	NC	NC	0.0021	0.0287	0.0041 U	0.0039 U	0.3728	0.0042 U	0.1561	0.0908	0.0040 U
BENZO(A)ANTHRACENE	NC	NC	0.0038 U	0.0193	0.0041 U	0.0039 U	0.1800	0.0042 U	0.0810	0.0504	0.0040 U
BENZO(A)PYRENE	NC	NC	0.0019 J	0.0225	0.0041 U	0.0039 U	0.2850	0.0042 U	0.1210 J	0.0689 J	0.0040 U
BENZO(B)FLUORANTHENE	NC	NC	0.0023 J	0.0278	0.0041 U	0.0039 U	0.4020	0.0042 U	0.1700 J	0.0959 J	0.0040 U
BENZO(K)FLUORANTHENE	NC	NC	0.0038 U	0.0097	0.0041 U	0.0039 U	0.1390	0.0042 U	0.0596 J	0.0318 J	0.0040 U
CHRYSENE	NC	NC	0.0038 U	0.0181	0.0041 U	0.0039 U	0.2420	0.0042 U	0.0971 J	0.0548 J	0.0040 U
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0038 U	0.0040 U	0.0041 U	0.0039 U	0.0119	0.0042 U	0.0025 J	0.0028 J	0.0040 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0038 U	0.0137	0.0041 U	0.0039 U	0.1610	0.0042 U	0.0679	0.0411	0.0040 U
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0038 U	0.0040 U	0.0041 U	0.0039 U	0.0043 U	0.0042 U	0.0041 U	0.0040 U	0.0040 U
2-METHYLNAPHTHALENE	230	2200	0.0038 U	0.0040 U	0.0041 U	0.0039 U	0.0043 U	0.0042 U	0.0041 U	0.0040 U	0.0040 U
ACENAPHTHENE	3400	33000	0.0038 U	0.0040 U	0.0041 U	0.0039 U	0.0094 J	0.0042 U	0.0025 J	0.0040 U	0.0040 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0038 U	0.0040 U	0.0041 U	0.0039 U	0.0043 U	0.0042 U	0.0041 U	0.0040 U	0.0040 U
ANTHRACENE	17000	170000	0.0038 U	0.0040 U	0.0041 U	0.0039 U	0.0145	0.0042 U	0.0041 J	0.0024 J	0.0040 U
BENZO(G,H,I)PERYLENE	--	--	0.0038 U	0.0161	0.0041 U	0.0039 U	0.1910	0.0042 U	0.0786	0.0492	0.0040 U
FLUORANTHENE	2300	22000	0.0038 U	0.0169	0.0041 U	0.0039 U	0.2670	0.0042 U	0.1070 J	0.0608 J	0.0040 U
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0038 U	0.0040 U	0.0041 U	0.0039 U	0.0051 J	0.0042 U	0.0041 U	0.0040 U	0.0040 U
NAPHTHALENE	3.6	18	0.0023 U	0.0024 U	0.0025 U	0.0023 U	0.0026 U	0.0025 U	0.0025 U	0.0024 U	0.0024 U
PHENANTHRENE	--	--	0.0038 U	0.0040 U	0.0041 U	0.0039 U	0.0865	0.0042 U	0.0259	0.0157	0.0040 U
PYRENE	1700	17000	0.0038 U	0.0161	0.0041 U	0.0039 U	0.3150	0.0042 U	0.1290	0.0778	0.0040 U

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**5 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SS442-0102-D 20121003	X7-SB443		X7-SB445		X7-SB446											
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>																			
<b>CARCINOGENS</b>																			
BAP EQUIVALENT-HALFND	NC	NC	0.0040 U	0.0470	0.0041 U	0.0578	0.0038 U	0.0094	0.0044	3.0600	0.0429								
BAP EQUIVALENT-POS	NC	NC	0.0040 U	0.0449	0.0041 U	0.0557	0.0038 U	0.0094	0.0019	3.0580	0.0410								
BENZO(A)ANTHRACENE	NC	NC	0.0040 U	0.0289 J	0.0041 U	0.0435	0.0038 U	0.0065 J	0.0038 U	1.7700	0.0216								
BENZO(A)PYRENE	NC	NC	0.0040 U	0.0351 J	0.0041 U	0.0435	0.0038 U	0.0049 J	0.0038 U	2.4300	0.0326								
BENZO(B)FLUORANTHENE	NC	NC	0.0040 U	0.0462 J	0.0041 U	0.0536	0.0038 U	0.0053 J	0.0038 U	3.1700	0.0399								
BENZO(K)FLUORANTHENE	NC	NC	0.0040 U	0.0206 J	0.0041 U	0.0207	0.0038 U	0.0028 J	0.0038 U	0.9680	0.0148								
CHRYSENE	NC	NC	0.0040 U	0.0293 J	0.0041 U	0.0467	0.0038 U	0.0024 J	0.0038 U	2.2900	0.0254								
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0040 U	0.0041 U	0.0041 U	0.0038 U	0.0028 J	0.0019 J	0.0041 U	0.0038 U									
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0040 U	0.0206 J	0.0041 U	0.0227	0.0038 U	0.0049 J	0.0038 U	1.2200	0.0209								
<b>NON-CARCINOGENS</b>																			
1-METHYLNAPHTHALENE	16	53	0.0040 U	0.0041 U	0.0041 U	0.0041 U	0.0038 U	0.0040 U	0.0038 U	0.0134	0.0038 U								
2-METHYLNAPHTHALENE	230	2200	0.0040 U	0.0041 U	0.0041 U	0.0041 U	0.0038 U	0.0040 U	0.0038 U	0.0162	0.0038 U								
ACENAPHTHENE	3400	33000	0.0040 U	0.0041 U	0.0041 U	0.0020 J	0.0038 U	0.0040 U	0.0038 U	0.0790	0.0038 U								
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0040 U	0.0041 U	0.0041 U	0.0038 U	0.0040 U	0.0038 U	0.0041 U	0.0038 U									
ANTHRACENE	17000	170000	0.0040 U	0.0021 J	0.0041 U	0.0110	0.0038 U	0.0040 U	0.0038 U	0.0907	0.0038 U								
BENZO(G,H,I)PERYLENE	--	--	0.0040 U	0.0239 J	0.0041 U	0.0248	0.0038 U	0.0053 U	0.0038 U	1.3300	0.0247								
FLUORANTHENE	2300	22000	0.0040 U	0.0318 J	0.0041 U	0.0808	0.0038 U	0.0028 J	0.0038 U	2.6100	0.0247								
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0040 U	0.0041 UJ	0.0041 U	0.0037 J	0.0038 U	0.0040 U	0.0038 U	0.0421	0.0038 U								
NAPHTHALENE	3.6	18	0.0024 U	0.0025 U	0.0025 U	0.0024 U	0.0023 U	0.0053 J	0.0035 J	0.0547	0.0023 U								
PHENANTHRENE	--	--	0.0040 U	0.0120 J	0.0041 U	0.0447	0.0038 U	0.0040 U	0.0038 U	0.4320	0.0034 J								
PYRENE	1700	17000	0.0040 U	0.0417 J	0.0041 U	0.0589	0.0038 U	0.0024 J	0.0038 U	2.5000	0.0197								

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5



Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**6 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB447		X7-SB448		X7-SB449		X7-SB451	
			X7-SS447-0001 20120907	X7-SS447-0102 20120907	X7-SS448-0001 20120907	X7-SS448-0102 20120907	X7-SS449-0001 20120907	X7-SS449-0102 20120907	X7-SS451-0001 20120906	X7-SS451-0102 20120906
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>										
<b>CARCINOGENS</b>										
BAP EQUIVALENT-HALFD	NC	NC	0.3525	0.0065	0.1966	0.0039 U	0.0462	0.0038 U	0.0155	0.0036 U
BAP EQUIVALENT-POS	NC	NC	0.3505	0.0044	0.1945	0.0039 U	0.0441	0.0038 U	0.0134	0.0036 U
BENZO(A)ANTHRACENE	NC	NC	0.2020	0.0057 J	0.1010	0.0039 U	0.0246	0.0038 U	0.0103	0.0036 U
BENZO(A)PYRENE	NC	NC	0.2800	0.0034 J	0.1560	0.0039 U	0.0346	0.0038 U	0.0103	0.0036 U
BENZO(B)FLUORANTHENE	NC	NC	0.3300	0.0038 J	0.1970	0.0039 U	0.0458	0.0038 U	0.0141	0.0036 U
BENZO(K)FLUORANTHENE	NC	NC	0.1340	0.0038 U	0.0655	0.0039 U	0.0150	0.0038 U	0.0046 J	0.0036 U
CHRYSENE	NC	NC	0.2320	0.0023 J	0.1260	0.0039 U	0.0279	0.0038 U	0.0070 J	0.0036 U
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0041 U	0.0038 U	0.0042 U	0.0039 U	0.0042 U	0.0038 U	0.0041 U	0.0036 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.1570	0.0038 U	0.0793	0.0039 U	0.0225	0.0038 U	0.0062 J	0.0036 U
<b>NON-CARCINOGENS</b>										
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0038 U	0.0042 U	0.0039 U	0.0042 U	0.0038 U	0.0041 U	0.0036 U
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0038 U	0.0042 U	0.0039 U	0.0042 U	0.0038 U	0.0041 U	0.0036 U
ACENAPHTHENE	3400	33000	0.0130	0.0038 U	0.0105	0.0039 U	0.0042 U	0.0038 U	0.0041 U	0.0036 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0038 U	0.0042 U	0.0039 U	0.0042 U	0.0038 U	0.0041 U	0.0036 U
ANTHRACENE	17000	170000	0.0215	0.0038 U	0.0130	0.0039 U	0.0042 U	0.0038 U	0.0041 U	0.0036 U
BENZO(G,H,I)PERYLENE	--	--	0.1790	0.0023 J	0.0915	0.0039 U	0.0263	0.0038 U	0.0070 J	0.0036 U
FLUORANTHENE	2300	22000	0.3670	0.0046 J	0.1920	0.0039 U	0.0325	0.0038 U	0.0095	0.0036 U
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0057 J	0.0038 U	0.0029 J	0.0039 U	0.0042 U	0.0038 U	0.0041 U	0.0036 U
NAPHTHALENE	3.6	18	0.0024 U	0.0023 U	0.0025 U	0.0023 U	0.0025 U	0.0023 U	0.0025 U	0.0021 U
PHENANTHRENE	--	--	0.1170	0.0023 J	0.0751	0.0039 U	0.0092	0.0038 U	0.0025 J	0.0036 U
PYRENE	1700	17000	0.2650	0.0034 J	0.1750	0.0039 U	0.0300	0.0038 U	0.0087	0.0036 U

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**7 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB453		X7-SB455		X7-SB457		X7-SB459			
			X7-SS453-0001 20120906	X7-SS453-0102 20120906	X7-SS455-0001 20120906	X7-SS455-0102 20120906	X7-SS457-0001 20120906	X7-SS457-0102 20120907	X7-SS459-0001 20120907	X7-SS459-0102 20120907		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.0179	0.0042	0.0195	0.0036 U	0.0382	0.0036 U	0.0042 U	0.0042 U		
BAP EQUIVALENT-POS	NC	NC	0.0159	0.0000	0.0175	0.0036 U	0.0363	0.0036 U	0.0042 U	0.0042 U		
BENZO(A)ANTHRACENE	NC	NC	0.0112	0.0036 U	0.0123	0.0036 U	0.0200	0.0036 U	0.0042 U	0.0042 U		
BENZO(A)PYRENE	NC	NC	0.0124	0.0036 U	0.0135	0.0036 U	0.0285	0.0036 U	0.0042 U	0.0042 U		
BENZO(B)FLUORANTHENE	NC	NC	0.0160	0.0036 U	0.0181	0.0036 U	0.0369	0.0036 U	0.0042 U	0.0042 U		
BENZO(K)FLUORANTHENE	NC	NC	0.0052 J	0.0036 U	0.0057 J	0.0036 U	0.0131	0.0036 U	0.0042 U	0.0042 U		
CHRYSENE	NC	NC	0.0100	0.0025 J	0.0094	0.0036 U	0.0219	0.0036 U	0.0042 U	0.0042 U		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0040 U	0.0036 U	0.0041 U	0.0036 U	0.0039 U	0.0036 U	0.0042 U	0.0042 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0068 J	0.0036 U	0.0086	0.0036 U	0.0192	0.0036 U	0.0042 U	0.0042 U		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0040 U	0.0036 U	0.0041 U	0.0036 U	0.0039 U	0.0036 U	0.0042 U	0.0042 U		
2-METHYLNAPHTHALENE	230	2200	0.0040 U	0.0036 U	0.0041 U	0.0036 U	0.0039 U	0.0036 U	0.0042 U	0.0042 U		
ACENAPHTHENE	3400	33000	0.0040 UJ	0.0036 U	0.0041 U	0.0036 U	0.0039 U	0.0036 U	0.0042 U	0.0042 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0040 UJ	0.0036 U	0.0041 U	0.0036 U	0.0039 U	0.0036 U	0.0042 U	0.0042 U		
ANTHRACENE	17000	170000	0.0040 U	0.0036 U	0.0041 U	0.0036 U	0.0039 U	0.0036 U	0.0042 U	0.0042 U		
BENZO(G,H,I)PERYLENE	--	--	0.0080	0.0036 U	0.0103	0.0036 U	0.0235	0.0036 U	0.0042 U	0.0042 U		
FLUORANTHENE	2300	22000	0.0128	0.0036 U	0.0127	0.0036 U	0.0215	0.0036 U	0.0042 U	0.0042 U		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0040 UJ	0.0036 U	0.0041 U	0.0036 U	0.0039 U	0.0036 U	0.0042 U	0.0042 U		
NAPHTHALENE	3.6	18	0.0024 UJ	0.0022 U	0.0025 U	0.0021 U	0.0023 U	0.0022 U	0.0025 U	0.0025 U		
PHENANTHRENE	--	--	0.0036 J	0.0036 U	0.0041 J	0.0036 U	0.0058 J	0.0036 U	0.0042 U	0.0042 U		
PYRENE	1700	17000	0.0100	0.0036 U	0.0115	0.0036 U	0.0238	0.0036 U	0.0042 U	0.0042 U		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**8 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB460		X7-SB462				X7-SS462-0102 20120907	X7-SB463-0204 20120907					
			X7-SS460-0001 20120907	X7-SS460-0102 20120907	X7-SB462-0204 20120907	X7-SB462-0406 20120907	X7-SS462-0001 20120907								
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>															
<b>CARCINOGENS</b>															
BAP EQUIVALENT-HALFND	NC	NC	0.1112	0.0038 U	0.0043 U	0.0041 U	0.0742	0.0055	0.0040 U						
BAP EQUIVALENT-POS	NC	NC	0.1092	0.0038 U	0.0043 U	0.0041 U	0.0723	0.0034	0.0040 U						
BENZO(A)ANTHRACENE	NC	NC	0.0689	0.0038 U	0.0043 U	0.0041 U	0.0417	0.0051 J	0.0040 U						
BENZO(A)PYRENE	NC	NC	0.0834	0.0038 U	0.0043 U	0.0041 U	0.0566	0.0026 J	0.0040 U						
BENZO(B)FLUORANTHENE	NC	NC	0.1360	0.0038 U	0.0043 U	0.0041 U	0.0806	0.0033 J	0.0040 U						
BENZO(K)FLUORANTHENE	NC	NC	0.0373	0.0038 U	0.0043 U	0.0041 U	0.0264	0.0037 U	0.0040 U						
CHRYSENE	NC	NC	0.0677	0.0038 U	0.0043 U	0.0041 U	0.0570	0.0037 U	0.0040 U						
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0040 U	0.0038 U	0.0043 U	0.0041 U	0.0039 U	0.0037 U	0.0040 U						
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0485	0.0038 U	0.0043 U	0.0041 U	0.0311	0.0037 U	0.0040 U						
<b>NON-CARCINOGENS</b>															
1-METHYLNAPHTHALENE	16	53	0.0040 U	0.0038 U	0.0043 U	0.0041 U	0.0039 U	0.0037 U	0.0040 U						
2-METHYLNAPHTHALENE	230	2200	0.0040 U	0.0038 U	0.0043 U	0.0041 U	0.0039 U	0.0037 U	0.0040 U						
ACENAPHTHENE	3400	33000	0.0028 J	0.0038 U	0.0043 U	0.0041 U	0.0039 U	0.0037 U	0.0040 U						
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0040 U	0.0038 U	0.0043 U	0.0041 U	0.0039 U	0.0037 U	0.0040 U						
ANTHRACENE	17000	170000	0.0036 J	0.0038 U	0.0043 U	0.0041 U	0.0024 J	0.0037 U	0.0040 U						
BENZO(G,H,I)PERYLENE	--	--	0.0621	0.0038 U	0.0043 U	0.0041 U	0.0370	0.0037 U	0.0040 U						
FLUORANTHENE	2300	22000	0.0846	0.0038 U	0.0043 U	0.0041 U	0.0531	0.0022 J	0.0040 U						
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0040 U	0.0038 U	0.0043 U	0.0041 U	0.0039 U	0.0037 U	0.0040 U						
NAPHTHALENE	3.6	18	0.0028 J	0.0023 U	0.0034 J	0.0033 J	0.0024 U	0.0022 U	0.0036 J						
PHENANTHRENE	--	--	0.0277	0.0038 U	0.0043 U	0.0041 U	0.0173	0.0037 U	0.0040 U						
PYRENE	1700	17000	0.0798	0.0038 U	0.0043 U	0.0041 U	0.0523	0.0026 J	0.0040 U						

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**9 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB463			X7-SB464			X7-SB465			
			X7-SB463-0406 20120907	X7-SS463-0001 20120907	X7-SS463-0102 20120907	X7-SB464-0204 20120907	X7-SB464-0406 20120907	X7-SS464-0001 20120907	X7-SS464-0102 20120907	X7-SS465-0001 20120907	X7-SS465-0102 20120907	
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFD	NC	NC	0.0039 U	21.8317	0.0369	0.0039 U	0.0128	1.8777	0.2928	0.2092	0.0037 U	
BAP EQUIVALENT-POS	NC	NC	0.0039 U	21.8114	0.0350	0.0039 U	0.0108	1.8757	0.2909	0.2072	0.0037 U	
BENZO(A)ANTHRACENE	NC	NC	0.0039 U	13.1000	0.0207	0.0039 U	0.0100	1.2100	0.1580	0.1190	0.0037 U	
BENZO(A)PYRENE	NC	NC	0.0039 U	17.2000	0.0267	0.0039 U	0.0080	1.4700	0.2280	0.1600	0.0037 U	
BENZO(B)FLUORANTHENE	NC	NC	0.0039 U	23.3000	0.0413	0.0039 U	0.0112	1.9700	0.3240	0.2500	0.0037 U	
BENZO(K)FLUORANTHENE	NC	NC	0.0039 U	6.9100	0.0109	0.0039 U	0.0040 J	0.6510	0.0972	0.0667	0.0037 U	
CHRYSENE	NC	NC	0.0039 U	18.3000	0.0203	0.0039 U	0.0060 J	1.4500	0.2040	0.1460	0.0037 U	
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0039 U	0.0406 U	0.0038 U	0.0039 U	0.0040 U	0.0042 U	0.0038 U	0.0039 U	0.0037 U	
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0039 U	8.8400	0.0195	0.0039 U	0.0064 J	0.7970	0.1350	0.0951	0.0037 U	
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0039 U	0.1630	0.0038 U	0.0039 U	0.0040 U	0.0071 J	0.0038 U	0.0039 U	0.0037 U	
2-METHYLNAPHTHALENE	230	2200	0.0039 U	0.1950	0.0038 U	0.0039 U	0.0040 U	0.0079 J	0.0038 U	0.0039 U	0.0037 U	
ACENAPHTHENE	3400	33000	0.0039 U	1.0400	0.0038 U	0.0039 U	0.0040 U	0.1090	0.0050 J	0.0059 J	0.0037 U	
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0039 U	0.0406 U	0.0038 U	0.0039 U	0.0040 U	0.0042 U	0.0038 U	0.0039 U	0.0037 U	
ANTHRACENE	17000	170000	0.0039 U	1.1100	0.0038 U	0.0039 U	0.0040 U	0.1220	0.0073 J	0.0087	0.0037 U	
BENZO(G,H,I)PERYLENE	--	--	0.0039 U	10.1000	0.0225	0.0039 U	0.0076 U	0.9430	0.1640	0.1200	0.0037 U	
FLUORANTHENE	2300	22000	0.0039 U	19.7000	0.0225	0.0039 U	0.0068 J	2.2100	0.2090	0.1770 J	0.0037 U	
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0039 U	0.5770	0.0038 U	0.0039 U	0.0040 U	0.0451	0.0027 J	0.0032 J	0.0037 U	
NAPHTHALENE	3.6	18	0.0024 J	0.7840	0.0023 U	0.0023 J	0.0032 J	0.0079 J	0.0031 J	0.0028 J	0.0022 U	
PHENANTHRENE	--	--	0.0039 U	5.4800	0.0064 J	0.0039 U	0.0040 U	1.0000	0.0516	0.0643	0.0037 U	
PYRENE	1700	17000	0.0039 U	18.5000	0.0218	0.0039 U	0.0060 J	1.9000	0.2000	0.1650	0.0037 U	

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**10 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB466			X7-SB469		X7-SB470			
			X7-SS466-0001 20120907	X7-SS466-0102 20120907	X7-SS466-0102-D 20120907	X7-SS469-0001 20121003	X7-SS469-0102 20121003	X7-SS470-0001 20121003	X7-SS470-0102 20121003		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>											
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFND	NC	NC	0.1250	0.0036 U	0.1124	0.5727	0.0038 U	2.3332	0.0441		
BAP EQUIVALENT-POS	NC	NC	0.1230	0.0036 U	0.1105	<b>0.5727</b>	0.0038 U	<b>2.3332</b>	0.0421		
BENZO(A)ANTHRACENE	NC	NC	0.0586	0.0036 UJ	0.0598 J	0.3410	0.0038 U	1.3000	0.0255		
BENZO(A)PYRENE	NC	NC	0.0964	0.0036 UJ	0.0866 J	0.4510	0.0038 U	1.8500	0.0332		
BENZO(B)FLUORANTHENE	NC	NC	0.1410	0.0036 UJ	0.1220 J	0.5790	0.0038 U	2.3300	0.0441		
BENZO(K)FLUORANTHENE	NC	NC	0.0382	0.0036 UJ	0.0391 J	0.2020	0.0038 U	0.6970	0.0158		
CHRYSENE	NC	NC	0.0821	0.0036 UJ	0.0751 J	0.4250	0.0038 U	1.5100	0.0274		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0040 U	0.0036 U	0.0038 U	0.0061 J	0.0038 U	0.0237	0.0039 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0617	0.0036 UJ	0.0521 J	0.2110	0.0038 U	0.8800	0.0178		
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0040 U	0.0036 U	0.0038 U	0.0033 J	0.0038 U	0.0056 J	0.0039 U		
2-METHYLNAPHTHALENE	230	2200	0.0040 U	0.0036 U	0.0038 U	0.0037 J	0.0038 U	0.0068 J	0.0039 U		
ACENAPHTHENE	3400	33000	0.0024 J	0.0036 U	0.0038 U	0.0147	0.0038 U	0.0816	0.0039 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0040 U	0.0036 U	0.0038 U	0.0041 U	0.0038 U	0.0040 U	0.0039 U		
ANTHRACENE	17000	170000	0.0028 J	0.0036 U	0.0027 J	0.0196	0.0038 U	0.1210	0.0023 J		
BENZO(G,H,I)PERYLENE	--	--	0.0777	0.0036 UJ	0.0651 J	0.2180	0.0038 U	1.0300	0.0220		
FLUORANTHENE	2300	22000	0.0852	0.0036 UJ	0.0713 J	0.4290	0.0038 U	2.2100	0.0383		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0040 U	0.0036 U	0.0038 U	0.0086	0.0038 U	0.0386	0.0039 U		
NAPHTHALENE	3.6	18	0.0024 J	0.0022 U	0.0023 U	0.0024 U	0.0023 U	0.0024 U	0.0023 U		
PHENANTHRENE	--	--	0.0251	0.0036 U	0.0157	0.1130	0.0038 U	0.7180	0.0155		
PYRENE	1700	17000	0.0821	0.0036 UJ	0.0694 J	0.4970	0.0038 U	2.5700	0.0336		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.



Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**11 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SS471-0001 20120907	X7-SS471-0001-D 20120907	X7-SS471-0102 20120907	X7-SS472-0001 20121003	X7-SS472-0102 20121003	X7-SS491-0001 20120906	X7-SS491-0102 20120906	X7-SS492-0001 20120906	X7-SS492-0102 20120906
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>											
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFD	NC	NC	0.2317	0.0963	0.0036 U	0.0037 U	0.0038 U	0.0135	0.0036 U	0.0607	0.0067
BAP EQUIVALENT-POS	NC	NC	0.2297	0.0943	0.0036 U	0.0037 U	0.0038 U	0.0115	0.0036 U	0.0586	0.0049
BENZO(A)ANTHRACENE	NC	NC	0.1270 J	0.0540 J	0.0036 U	0.0037 U	0.0038 U	0.0100	0.0036 U	0.0373	0.0055 J
BENZO(A)PYRENE	NC	NC	0.1800 J	0.0738 J	0.0036 U	0.0037 U	0.0038 U	0.0088	0.0036 U	0.0458	0.0037 J
BENZO(B)FLUORANTHENE	NC	NC	0.2560 J	0.1050 J	0.0036 U	0.0037 U	0.0038 U	0.0119	0.0036 U	0.0620	0.0048 J
BENZO(K)FLUORANTHENE	NC	NC	0.0761 J	0.0346 J	0.0036 U	0.0037 U	0.0038 U	0.0040 J	0.0036 U	0.0186	0.0037 U
CHRYSENE	NC	NC	0.1610 J	0.0651 J	0.0036 U	0.0037 U	0.0038 U	0.0064 J	0.0036 U	0.0417	0.0026 J
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0040 U	0.0041 U	0.0036 U	0.0037 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0037 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.1050 J	0.0416 J	0.0036 U	0.0037 U	0.0038 U	0.0052 J	0.0036 U	0.0267	0.0022 J
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0040 U	0.0041 U	0.0036 U	0.0037 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0037 U
2-METHYLNAPHTHALENE	230	2200	0.0040 U	0.0041 U	0.0036 U	0.0037 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0037 U
ACENAPHTHENE	3400	33000	0.0052 J	0.0041 U	0.0036 U	0.0037 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0037 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0040 U	0.0041 U	0.0036 U	0.0037 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0037 U
ANTHRACENE	17000	170000	0.0076 J	0.0029 J	0.0036 U	0.0037 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0037 U
BENZO(G,H,I)PERYLENE	--	--	0.1300 J	0.0524 J	0.0036 U	0.0037 U	0.0038 U	0.0068 J	0.0036 U	0.0308	0.0037 U
FLUORANTHENE	2300	22000	0.1690 J	0.0668 J	0.0036 U	0.0037 U	0.0038 U	0.0076 J	0.0036 U	0.0413	0.0026 J
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0024 J	0.0041 U	0.0036 U	0.0037 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0037 U
NAPHTHALENE	3.6	18	0.0032 J	0.0025 U	0.0022 U	0.0022 U	0.0023 U	0.0024 U	0.0022 U	0.0024 U	0.0022 U
PHENANTHRENE	--	--	0.0438 J	0.0181 J	0.0036 U	0.0037 U	0.0038 U	0.0024 J	0.0036 U	0.0081	0.0037 U
PYRENE	1700	17000	0.1560 J	0.0639 J	0.0036 U	0.0037 U	0.0038 U	0.0084	0.0036 U	0.0385	0.0026 J

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered



**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**12 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB493		X7-SB494		X7-SB497		X7-SB498	
			X7-SS493-0001 20120906	X7-SS493-0102 20120906	X7-SS494-0001 20120906	X7-SS494-0102 20120906	X7-SS497-0001 20121003	X7-SS497-0102 20121003	X7-SS498-0001 20120906	X7-SS498-0102 20120906
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>										
<b>CARCINOGENS</b>										
BAP EQUIVALENT-HALFD	NC	NC	0.1202	0.0036 U	0.0230	0.0038 U	0.0182	0.0342	0.0052	0.0039 U
BAP EQUIVALENT-POS	NC	NC	0.1182	0.0036 U	0.0210	0.0038 U	0.0160	0.0322	0.0028	0.0039 U
BENZO(A)ANTHRACENE	NC	NC	0.0751	0.0036 U	0.0157	0.0038 U	0.0136	0.0219	0.0041 U	0.0039 U
BENZO(A)PYRENE	NC	NC	0.0916	0.0036 U	0.0161	0.0038 U	0.0122	0.0251	0.0024 J	0.0039 U
BENZO(B)FLUORANTHENE	NC	NC	0.1300	0.0036 U	0.0226	0.0038 U	0.0166	0.0353	0.0033 J	0.0039 U
BENZO(K)FLUORANTHENE	NC	NC	0.0422	0.0036 U	0.0085	0.0038 U	0.0066 J	0.0105	0.0041 U	0.0039 U
CHRYSENE	NC	NC	0.0715	0.0036 U	0.0133	0.0038 U	0.0096	0.0231	0.0041 U	0.0039 U
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0040 U	0.0036 U	0.0040 U	0.0038 U	0.0044 U	0.0041 U	0.0041 U	0.0039 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0559	0.0036 U	0.0093	0.0038 U	0.0070 J	0.0126	0.0041 U	0.0039 U
<b>NON-CARCINOGENS</b>										
1-METHYLNAPHTHALENE	16	53	0.0040 U	0.0036 U	0.0040 U	0.0038 U	0.0044 U	0.0041 U	0.0041 U	0.0039 U
2-METHYLNAPHTHALENE	230	2200	0.0040 U	0.0036 U	0.0040 U	0.0038 U	0.0044 U	0.0041 U	0.0041 U	0.0039 U
ACENAPHTHENE	3400	33000	0.0040 U	0.0036 U	0.0040 U	0.0038 U	0.0044 U	0.0041 U	0.0041 U	0.0039 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0040 U	0.0036 U	0.0040 U	0.0038 U	0.0044 U	0.0041 U	0.0041 U	0.0039 U
ANTHRACENE	17000	170000	0.0028 J	0.0036 U	0.0040 U	0.0038 U	0.0044 U	0.0041 U	0.0041 U	0.0039 U
BENZO(G,H,I)PERYLENE	--	--	0.0679	0.0036 U	0.0117	0.0038 U	0.0088	0.0146	0.0041 U	0.0039 U
FLUORANTHENE	2300	22000	0.0759	0.0036 U	0.0141	0.0038 U	0.0153	0.0227	0.0028 J	0.0039 U
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0040 U	0.0036 U	0.0040 U	0.0038 U	0.0044 U	0.0041 U	0.0041 U	0.0039 U
NAPHTHALENE	3.6	18	0.0024 U	0.0022 U	0.0024 U	0.0023 U	0.0026 U	0.0024 U	0.0024 U	0.0023 U
PHENANTHRENE	--	--	0.0141	0.0036 U	0.0036 J	0.0038 U	0.0074 J	0.0065 J	0.0041 U	0.0039 U
PYRENE	1700	17000	0.0751	0.0036 U	0.0137	0.0038 U	0.0149	0.0243	0.0024 J	0.0039 U

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**13 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB502		X7-SB503		X7-SB504		X7-SB505		
	X7-SS502-0001 20120906	X7-SS502-0102 20120906	X7-SS503-0001 20120906	X7-SS503-0102 20120906	X7-SS504-0001 20121003	X7-SS504-0102 20121003	X7-SB505-0204 20120906	X7-SB505-0406 20120906	X7-SS505-0001 20120906	X7-SS505-0102 20120906	
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>											
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFD	NC	NC	0.0351	0.0077	0.1635	0.0117	0.0074	0.0039 U	0.0039 U	0.0040 U	0.0123
BAP EQUIVALENT-POS	NC	NC	0.0331	0.0059	0.1614	0.0097	0.0053	0.0039 U	0.0039 U	0.0040 U	0.0103
BENZO(A)ANTHRACENE	NC	NC	0.0212	0.0066 J	0.0906	0.0090	0.0074 J	0.0039 U	0.0039 U	0.0040 U	0.0098
BENZO(A)PYRENE	NC	NC	0.0258	0.0044 J	0.1280	0.0073 J	0.0037 J	0.0039 U	0.0039 U	0.0040 U	0.0078 J
BENZO(B)FLUORANTHENE	NC	NC	0.0349	0.0062 J	0.1670	0.0102	0.0058 J	0.0039 U	0.0039 U	0.0040 U	0.0110
BENZO(K)FLUORANTHENE	NC	NC	0.0121	0.0022 J	0.0591	0.0033 J	0.0025 J	0.0039 U	0.0039 U	0.0040 U	0.0041 J
CHRYSENE	NC	NC	0.0212	0.0033 J	0.1120	0.0057 J	0.0033 J	0.0039 U	0.0039 U	0.0040 U	0.0057 J
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0042 U	0.0036 U	0.0043 U	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0040 U	0.0194 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0150	0.0026 J	0.0693	0.0037 J	0.0025 J	0.0039 U	0.0039 U	0.0040 U	0.0041 J
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0042 U	0.0036 U	0.0043 U	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0040 U	0.0041 U
2-METHYLNAPHTHALENE	230	2200	0.0042 U	0.0036 U	0.0043 U	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0040 U	0.0041 U
ACENAPHTHENE	3400	33000	0.0042 U	0.0036 U	0.0026 J	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0040 U	0.0041 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0042 U	0.0036 U	0.0043 U	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0040 U	0.0194 U
ANTHRACENE	17000	170000	0.0042 U	0.0036 U	0.0064 J	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0040 U	0.0041 U
BENZO(G,H,I)PERYLENE	--	--	0.0183	0.0029 J	0.0795	0.0045 J	0.0029 J	0.0039 U	0.0039 U	0.0040 U	0.0049 J
FLUORANTHENE	2300	22000	0.0200	0.0040 J	0.1060	0.0090	0.0062 J	0.0039 U	0.0039 U	0.0040 U	0.0069 J
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0042 U	0.0036 U	0.0026 J	0.0041 U	0.0041 U	0.0039 U	0.0039 U	0.0040 U	0.0041 U
NAPHTHALENE	3.6	18	0.0025 U	0.0022 U	0.0026 U	0.0025 U	0.0025 U	0.0024 U	0.0024 U	0.0024 U	0.0025 U
PHENANTHRENE	--	--	0.0050 J	0.0036 U	0.0323	0.0041 J	0.0037 J	0.0039 U	0.0039 U	0.0040 U	0.0041 U
PYRENE	1700	17000	0.0196	0.0040 J	0.1000	0.0086	0.0058 J	0.0039 U	0.0039 U	0.0040 U	0.0069 J

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered



**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**14 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB506		X7-SB507		X7-SB510		X7-SB511		
			X7-SS506-0001 2012003	X7-SS506-0102 2012003	X7-SS507-0001 20120906	X7-SS507-0102 20120906	X7-SS510-0001 20120906	X7-SS510-0102 20120906	X7-SS511-0001 20120906	X7-SS511-0102 20120906	X7-SS511-0102-D 20120906
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>											
<b>CARCINOGENS</b>											
BAP EQUIVALENT-HALFND	NC	NC	0.0047	0.0051	0.0047	0.0046	0.0110	0.0541	0.5017	0.0098	0.0183
BAP EQUIVALENT-POS	NC	NC	0.0002	0.0029	0.0002	0.0022	0.0090	0.0522	0.4997	0.0078	0.0164
BENZO(A)ANTHRACENE	NC	NC	0.0041 U	0.0056 J	0.0041 U	0.0038 U	0.0084	0.0316	0.2720	0.0078 J	0.0123
BENZO(A)PYRENE	NC	NC	0.0041 U	0.0020 J	0.0041 U	0.0019 J	0.0068 J	0.0411	0.4000	0.0058 J	0.0127
BENZO(B)FLUORANTHENE	NC	NC	0.0021 J	0.0032 J	0.0024 J	0.0031 J	0.0095	0.0545	0.4940	0.0085	0.0174
BENZO(K)FLUORANTHENE	NC	NC	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0036 J	0.0204	0.1850	0.0035 J	0.0058 J
CHRYSENE	NC	NC	0.0041 U	0.0020 J	0.0041 U	0.0038 U	0.0048 J	0.0352	0.3280	0.0047 J	0.0096
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0039 U	0.0039 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 J	0.0229	0.2090	0.0035 J	0.0062 J
<b>NON-CARCINOGENS</b>											
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0039 U	0.0039 U
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 U	0.0036 U	0.0029 J	0.0039 U	0.0039 U
ACENAPHTHENE	3400	33000	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 U	0.0036 U	0.0070 J	0.0039 U	0.0039 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 U	0.0036 U	0.0041 U	0.0039 U	0.0039 U
ANTHRACENE	17000	170000	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 U	0.0036 U	0.0090 J	0.0039 U	0.0039 U
BENZO(G,H,I)PERYLENE	--	--	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0048 J	0.0269	0.2420	0.0039 J	0.0069 J
FLUORANTHENE	2300	22000	0.0041 U	0.0040 J	0.0041 U	0.0023 J	0.0068 J	0.0327	0.3020	0.0074 J	0.0127
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 U	0.0036 U	0.0041 J	0.0039 U	0.0039 U
NAPHTHALENE	3.6	18	0.0025 U	0.0024 U	0.0024 U	0.0023 U	0.0024 U	0.0022 U	0.0119	0.0023 U	0.0023 U
PHENANTHRENE	--	--	0.0041 U	0.0040 U	0.0041 U	0.0038 U	0.0040 U	0.0058 J	0.0503	0.0031 J	0.0035 J
PYRENE	1700	17000	0.0041 U	0.0036 J	0.0041 U	0.0023 J	0.0064 J	0.0323	0.3150	0.0062 J	0.0127

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4



Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**15 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB513		X7-SB518		X7-SB519		X7-SB521										
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>																			
<b>CARCINOGENS</b>																			
BAP EQUIVALENT-HALFND	NC	NC	0.0067	0.0039 U	0.0383	0.0088	0.0295	0.0227	0.0126	0.0050	0.0045								
BAP EQUIVALENT-POS	NC	NC	0.0046	0.0039 U	0.0363	0.0069	0.0275	0.0209	0.0106	0.0027	0.0003								
BENZO(A)ANTHRACENE	NC	NC	0.0069 J	0.0039 U	0.0234	0.0070 J	0.0179	0.0161	0.0102	0.0038 U	0.0038 U								
BENZO(A)PYRENE	NC	NC	0.0033 J	0.0039 U	0.0283	0.0052 J	0.0214	0.0161	0.0079	0.0023 J	0.0038 U								
BENZO(B)FLUORANTHENE	NC	NC	0.0045 J	0.0039 U	0.0388	0.0074 J	0.0288	0.0212	0.0114	0.0038 J	0.0027 J								
BENZO(K)FLUORANTHENE	NC	NC	0.0041 U	0.0039 U	0.0121	0.0030 J	0.0097	0.0077	0.0039 J	0.0038 U	0.0038 U								
CHRYSENE	NC	NC	0.0029 J	0.0039 U	0.0230	0.0037 J	0.0171	0.0132	0.0067 J	0.0038 U	0.0038 U								
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0041 U	0.0039 U	0.0040 U	0.0037 U	0.0039 U	0.0037 U	0.0039 U	0.0038 U	0.0038 U								
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0020 J	0.0039 U	0.0166	0.0030 J	0.0136	0.0099	0.0055 J	0.0038 U	0.0038 U								
<b>NON-CARCINOGENS</b>																			
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0039 U	0.0040 U	0.0037 U	0.0039 U	0.0037 U	0.0039 U	0.0038 U	0.0038 U								
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0039 U	0.0040 U	0.0037 U	0.0039 U	0.0037 U	0.0039 U	0.0038 U	0.0038 U								
ACENAPHTHENE	3400	33000	0.0041 U	0.0039 U	0.0040 U	0.0037 U	0.0039 U	0.0037 U	0.0039 U	0.0038 U	0.0038 U								
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0039 U	0.0040 U	0.0037 U	0.0039 U	0.0037 U	0.0039 U	0.0038 U	0.0038 U								
ANTHRACENE	17000	170000	0.0041 U	0.0039 U	0.0040 U	0.0037 U	0.0039 U	0.0037 U	0.0039 U	0.0038 U	0.0038 U								
BENZO(G,H,I)PERYLENE	--	--	0.0029 J	0.0039 U	0.0198	0.0037 J	0.0160	0.0121	0.0067 J	0.0038 U	0.0038 U								
FLUORANTHENE	2300	22000	0.0049 J	0.0039 U	0.0198	0.0048 J	0.0183	0.0132	0.0079	0.0030 J	0.0019 J								
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0041 U	0.0039 U	0.0040 U	0.0037 U	0.0039 U	0.0037 U	0.0039 U	0.0038 U	0.0038 U								
NAPHTHALENE	3.6	18	0.0024 U	0.0024 U	0.0024 U	0.0022 U	0.0023 U	0.0022 U	0.0024 U	0.0023 U	0.0023 U								
PHENANTHRENE	--	--	0.0029 J	0.0039 U	0.0044 J	0.0037 U	0.0047 J	0.0037 J	0.0024 J	0.0038 U	0.0038 U								
PYRENE	1700	17000	0.0053 J	0.0039 U	0.0194	0.0044 J	0.0195	0.0132	0.0071 J	0.0023 J	0.0038 U								

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered



**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**16 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB522		X7-SB525		X7-SB526					
			X7-SS522-0001 20120906	X7-SS522-0102 20120906	X7-SS525-0001 20120906	X7-SS525-0102 20120906	X7-SB526-0204 20120906	X7-SB526-0406 20120906	X7-SS526-0001 20120906	X7-SS526-0102 20120906		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.0111	0.0046	0.0057	0.0039 U	0.0074	0.0064	0.0082	0.3024		
BAP EQUIVALENT-POS	NC	NC	0.0090	0.0022	0.0034	0.0039 U	0.0055	0.0042	0.0059	0.3006		
BENZO(A)ANTHRACENE	NC	NC	0.0095	0.0039 U	0.0041 U	0.0039 U	0.0063 J	0.0039 U	0.0041 U	0.1680		
BENZO(A)PYRENE	NC	NC	0.0066 J	0.0019 J	0.0029 J	0.0039 U	0.0041 J	0.0035 J	0.0049 J	0.2370		
BENZO(B)FLUORANTHENE	NC	NC	0.0103	0.0031 J	0.0037 J	0.0039 U	0.0052 J	0.0043 J	0.0069 J	0.3250		
BENZO(K)FLUORANTHENE	NC	NC	0.0033 J	0.0039 U	0.0041 U	0.0039 U	0.0022 J	0.0039 U	0.0028 J	0.1160		
CHRYSENE	NC	NC	0.0062 J	0.0039 U	0.0041 U	0.0039 U	0.0030 J	0.0024 J	0.0037 J	0.2130		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0041 U	0.0039 U	0.0041 U	0.0039 U	0.0037 U	0.0039 U	0.0041 U	0.0037 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0045 J	0.0039 U	0.0021 J	0.0039 U	0.0026 J	0.0024 J	0.0033 J	0.1290		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0039 U	0.0041 U	0.0039 U	0.0037 U	0.0039 U	0.0041 U	0.0037 U		
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0039 U	0.0041 U	0.0039 U	0.0037 U	0.0039 U	0.0041 U	0.0037 U		
ACENAPHTHENE	3400	33000	0.0041 U	0.0039 U	0.0041 U	0.0039 U	0.0037 U	0.0039 U	0.0041 U	0.0063 J		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0039 U	0.0041 U	0.0039 U	0.0037 U	0.0039 U	0.0041 U	0.0037 U		
ANTHRACENE	17000	170000	0.0041 U	0.0039 U	0.0041 U	0.0039 U	0.0037 U	0.0039 U	0.0041 U	0.0134		
BENZO(G,H,I)PERYLENE	--	--	0.0053 J	0.0039 U	0.0029 J	0.0039 U	0.0034 J	0.0028 J	0.0045 J	0.1620		
FLUORANTHENE	2300	22000	0.0099	0.0023 J	0.0033 J	0.0039 U	0.0030 J	0.0031 J	0.0049 J	0.2270		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0041 U	0.0039 U	0.0041 U	0.0039 U	0.0037 U	0.0039 U	0.0041 U	0.0052 J		
NAPHTHALENE	3.6	18	0.0025 U	0.0023 U	0.0025 U	0.0023 U	0.0022 U	0.0024 U	0.0024 U	0.0045 J		
PHENANTHRENE	--	--	0.0053 J	0.0039 U	0.0041 U	0.0039 U	0.0037 U	0.0039 U	0.0041 U	0.0663		
PYRENE	1700	17000	0.0074 J	0.0019 J	0.0029 J	0.0039 U	0.0030 J	0.0031 J	0.0045 J	0.2230		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**17 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB527				X7-SB528				X7-SB529	
			X7-SB527-0204 20120906	X7-SB527-0406 20120906	X7-SS527-0001 20120906	X7-SS527-0102 20120906	X7-SB528-0204 20120906	X7-SB528-0406 20120906	X7-SS528-0001 20120906	X7-SS528-0102 20120906	X7-SS529-0001 20120906	X7-SS529-0102 20120906
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.0038 U	0.0103	0.0053	0.1835	1.9386	1.3748	0.0123	17.5821	0.0334	0.0884
BAP EQUIVALENT-POS	NC	NC	0.0038 U	0.0084	0.0028	0.1816	<b>1.9367</b>	<b>1.3728</b>	0.0103	<b>17.5730</b>	0.0313	0.0865
BENZO(A)ANTHRACENE	NC	NC	0.0038 U	0.0086	0.0041 U	0.1060	1.1700	0.7640	0.0086	10.2000	0.0221	0.0505
BENZO(A)PYRENE	NC	NC	0.0038 U	0.0062 J	0.0025 J	0.1440	1.5100	1.0800	0.0079	13.8000	0.0243	0.0681
BENZO(B)FLUORANTHENE	NC	NC	0.0038 U	0.0082	0.0033 J	0.1820	2.0300	1.4100	0.0110	19.1000	0.0328	0.0919
BENZO(K)FLUORANTHENE	NC	NC	0.0038 U	0.0035 J	0.0041 U	0.0762	0.7260	0.5680	0.0047 J	6.7200	0.0149	0.0337
CHRYSENE	NC	NC	0.0038 U	0.0051 J	0.0041 U	0.1300	1.2400	0.9360	0.0067 J	12.8000	0.0226	0.0620
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0038 U	0.0039 U	0.0041 U	0.0038 U	0.0037 U	0.0040 U	0.0039 U	0.0181 U	0.0043 U	0.0038 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0038 U	0.0043 J	0.0041 U	0.0789	0.9820	0.6880	0.0043 J	7.6300	0.0132	0.0379
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0038 U	0.0039 U	0.0041 U	0.0038 U	0.0037 J	0.0040 U	0.0039 U	0.0507	0.0043 U	0.0038 U
2-METHYLNAPHTHALENE	230	2200	0.0038 U	0.0039 U	0.0041 U	0.0038 U	0.0052 J	0.0028 J	0.0039 U	0.0598	0.0043 U	0.0038 U
ACENAPHTHENE	3400	33000	0.0038 U	0.0039 U	0.0041 U	0.0019 J	0.0384	0.0206	0.0039 U	0.5450	0.0043 U	0.0038 U
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0038 U	0.0039 U	0.0041 U	0.0038 U	0.0037 U	0.0040 U	0.0039 U	0.0181 U	0.0043 U	0.0038 U
ANTHRACENE	17000	170000	0.0038 U	0.0039 U	0.0041 U	0.0038 J	0.0429	0.0246	0.0039 U	0.5020	0.0043 U	0.0038 U
BENZO(G,H,I)PERYLENE	--	--	0.0038 U	0.0051 J	0.0041 U	0.0926	1.2200	0.8710	0.0051 J	8.5000	0.0149	0.0459
FLUORANTHENE	2300	22000	0.0038 U	0.0047 J	0.0029 J	0.1160	1.2000	0.7910	0.0071 J	11.8000	0.0226	0.0544
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0038 U	0.0039 U	0.0041 U	0.0038 U	0.0190	0.0135	0.0039 U	0.1920	0.0043 U	0.0038 U
NAPHTHALENE	3.6	18	0.0023 U	0.0023 U	0.0025 U	0.0023 U	0.0119	0.0067 J	0.0024 U	0.1540	0.0026 U	0.0023 U
PHENANTHRENE	--	--	0.0038 U	0.0039 U	0.0041 U	0.0191	0.2010	0.1420	0.0028 J	1.9100	0.0055 J	0.0077
PYRENE	1700	17000	0.0038 U	0.0047 J	0.0025 J	0.1120	1.1000	0.7680	0.0075 J	11.4000	0.0226	0.0547

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered



**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**18 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB530		X7-SB531		X7-SB533		X7-SB535			
			X7-SS530-0001 20120906	X7-SS530-0102 20120906	X7-SS531-0001 20120906	X7-SS531-0102 20120906	X7-SS533-0001 20121003	X7-SS533-0102 20121003	X7-SB535-0204 20120906	X7-SB535-0406 20120906	X7-SS535-0001 20120906	X7-SS535-0102 20120906
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFD	NC	NC	0.0132	0.1325	0.0111	0.0610	0.0040 U	0.1254	0.1240	0.0066	0.0361	3.0933
BAP EQUIVALENT-POS	NC	NC	0.0111	0.1305	0.0091	0.0385	0.0040 U	0.1254	0.1222	0.0044	0.0341	<b>3.0914</b>
BENZO(A)ANTHACENE	NC	NC	0.0103	0.0762	0.0096	0.0406 U	0.0040 U	0.0741	0.0768	0.0041 U	0.0214	1.9900
BENZO(A)PYRENE	NC	NC	0.0083	0.1030	0.0068 J	0.0324 J	0.0040 U	0.0920	0.0961	0.0037 J	0.0266	2.4600
BENZO(B)FLUORANTHENE	NC	NC	0.0124	0.1400	0.0100	0.0365 J	0.0040 U	0.1230	0.1200	0.0045 J	0.0373	3.0500
BENZO(K)FLUORANTHENE	NC	NC	0.0054 J	0.0483	0.0032 J	0.0406 U	0.0040 U	0.0421	0.0437	0.0041 U	0.0159	1.1300
CHRYSENE	NC	NC	0.0079 J	0.0896	0.0060 J	0.0406 U	0.0040 U	0.0849	0.0867	0.0025 J	0.0218	2.0500
DIBENZO(A,H)ANTHACENE	NC	NC	0.0041 U	0.0039 U	0.0040 U	0.0406 U	0.0040 U	0.0087	0.0036 U	0.0041 U	0.0040 U	0.0039 U
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0054 J	0.0531	0.0036 J	0.0243 J	0.0040 U	0.0446	0.0586	0.0025 J	0.0143	1.1400
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0039 U	0.0040 U	0.0406 U	0.0040 U	0.0042 U	0.0036 U	0.0041 U	0.0040 U	0.0062 J
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0039 U	0.0040 U	0.0406 U	0.0040 U	0.0042 U	0.0036 U	0.0041 U	0.0040 U	0.0090
ACENAPHTHENE	3400	33000	0.0041 U	0.0039 U	0.0040 U	0.0406 U	0.0040 U	0.0042 U	0.0036 U	0.0041 U	0.0040 U	0.0521
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0039 U	0.0040 U	0.0406 U	0.0040 U	0.0042 U	0.0036 U	0.0041 U	0.0040 U	0.0039 U
ANTHRACENE	17000	170000	0.0041 U	0.0031 J	0.0040 U	0.0406 U	0.0040 U	0.0042 U	0.0047 J	0.0041 U	0.0040 U	0.1580
BENZO(G,H,I)PERYLENE	--	--	0.0070 J	0.0589	0.0044 J	0.0243 J	0.0040 U	0.0475	0.0685	0.0029 J	0.0178	1.2200
FLUORANTHENE	2300	22000	0.0070 J	0.0762	0.0084	0.0406 U	0.0040 U	0.0787	0.0987	0.0029 J	0.0210	2.8600
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0041 U	0.0039 U	0.0040 U	0.0406 U	0.0040 U	0.0042 U	0.0036 U	0.0041 U	0.0040 U	0.0323
NAPHTHALENE	3.6	18	0.0025 U	0.0039 J	0.0024 U	0.0243 U	0.0024 U	0.0025 U	0.0022 U	0.0025 U	0.0024 U	0.0362
PHENANTHRENE	--	--	0.0041 U	0.0145	0.0032 J	0.0406 U	0.0040 U	0.0104	0.0189	0.0041 U	0.0059 J	0.6190
PYRENE	1700	17000	0.0066 J	0.0794	0.0076 J	0.0406 U	0.0040 U	0.0879	0.0856	0.0025 J	0.0262	2.9700

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5



Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**19 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB536		X7-SB540		X7-SB541					
			X7-SS536-0001 20120906	X7-SS536-0102 20120906	X7-SS540-0001 20121003	X7-SS540-0102 20121003	X7-SB541-0204 20120906	X7-SB541-0406 20120906	X7-SS541-0001 20120906	X7-SS541-0102 20120906		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>												
<b>CARCINOGENS</b>												
BAP EQUIVALENT-HALFND	NC	NC	0.0098	0.0046	0.0068	0.0106	0.0211	0.0037 U	2.1878	0.7873		
BAP EQUIVALENT-POS	NC	NC	0.0077	0.0023	0.0068	0.0086	0.0191	0.0037 U	<b>2.1857</b>	<b>0.7855</b>		
BENZO(A)ANTHRACENE	NC	NC	0.0093	0.0039 U	0.0057 J	0.0084	0.0166	0.0037 U	1.3600	0.4340		
BENZO(A)PYRENE	NC	NC	0.0055 J	0.0020 J	0.0033 J	0.0064 J	0.0146	0.0037 U	1.7400	0.6310		
BENZO(B)FLUORANTHENE	NC	NC	0.0089	0.0031 J	0.0053 J	0.0092	0.0187	0.0037 U	2.2200	0.7320		
BENZO(K)FLUORANTHENE	NC	NC	0.0021 J	0.0039 U	0.0029 J	0.0032 J	0.0089	0.0037 U	0.8240	0.2770		
CHRYSENE	NC	NC	0.0046 J	0.0039 U	0.0021 J	0.0052 J	0.0142	0.0037 U	1.5000	0.4850		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0042 U	0.0039 U	0.0021 J	0.0040 U	0.0041 U	0.0037 U	0.0041 U	0.0037 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0034 J	0.0039 U	0.0033 J	0.0040 J	0.0085	0.0037 U	0.7800	0.3460		
<b>NON-CARCINOGENS</b>												
1-METHYLNAPHTHALENE	16	53	0.0042 U	0.0039 U	0.0041 U	0.0040 U	0.0041 U	0.0037 U	0.0033 J	0.0037 U		
2-METHYLNAPHTHALENE	230	2200	0.0042 U	0.0039 U	0.0041 U	0.0040 U	0.0041 U	0.0037 U	0.0050 J	0.0037 U		
ACENAPHTHENE	3400	33000	0.0042 U	0.0039 U	0.0041 U	0.0040 U	0.0041 U	0.0037 U	0.0174	0.0060 J		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0042 U	0.0039 U	0.0041 U	0.0040 U	0.0041 U	0.0037 U	0.0041 U	0.0037 U		
ANTHRACENE	17000	170000	0.0021 J	0.0039 U	0.0041 U	0.0040 U	0.0041 U	0.0037 U	0.0501	0.0198		
BENZO(G,H,I)PERYLENE	--	--	0.0042 J	0.0039 U	0.0037 J	0.0044 J	0.0089	0.0037 U	0.8340	0.3900		
FLUORANTHENE	2300	22000	0.0148	0.0031 J	0.0029 J	0.0056 J	0.0142	0.0037 U	1.7700	0.5420		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0042 U	0.0039 U	0.0041 U	0.0040 U	0.0041 U	0.0037 U	0.0083	0.0030 J		
NAPHTHALENE	3.6	18	0.0025 U	0.0024 U	0.0025 U	0.0024 U	0.0024 U	0.0022 U	0.0021 J	0.0022 U		
PHENANTHRENE	--	--	0.0093	0.0039 U	0.0041 U	0.0040 U	0.0041 U	0.0037 U	0.2810	0.0975		
PYRENE	1700	17000	0.0114	0.0028 J	0.0033 J	0.0068 J	0.0122	0.0037 U	2.1300	0.5780		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent



J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated

mg/kg - Milligram per kilogram

NC - Not considered

**TABLE 6c**  
**ANALYTICAL DATA FOR PAHS - FULL APPENDIX**  
**2012 RFI ADDENDUM SAMPLE COLLECTION**  
**UXO 07**  
**NAVAL SUPPORT ACTIVITY**  
**CRANE, INDIANA**  
**20 OF 20**

LOCATION SAMPLE ID SAMPLE DATE	USEPA RESIDENTIAL RSL <sup>(1)</sup>	USEPA INDUSTRIAL RSL <sup>(1)</sup>	X7-SB542		X7-SB546			
			X7-SS542-0001 20120906	X7-SS542-0102 20120906	X7-SS546-0001 20121003	X7-SS546-0102 20121003		
<b>POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)</b>								
<b>CARCINOGENS</b>								
BAP EQUIVALENT-HALFND	NC	NC	0.0072	0.0045	0.0282	0.0040 U		
BAP EQUIVALENT-POS	NC	NC	0.0051	0.0002	0.0282	0.0040 U		
BENZO(A)ANTHRACENE	NC	NC	0.0061 J	0.0038 U	0.0184	0.0040 U		
BENZO(A)PYRENE	NC	NC	0.0037 J	0.0038 U	0.0200	0.0040 U		
BENZO(B)FLUORANTHENE	NC	NC	0.0057 J	0.0023 J	0.0298	0.0040 U		
BENZO(K)FLUORANTHENE	NC	NC	0.0041 U	0.0038 U	0.0090	0.0040 U		
CHRYSENE	NC	NC	0.0033 J	0.0038 U	0.0171	0.0040 U		
DIBENZO(A,H)ANTHRACENE	NC	NC	0.0041 U	0.0038 U	0.0020 J	0.0040 U		
INDENO(1,2,3-CD)PYRENE	NC	NC	0.0029 J	0.0038 U	0.0122	0.0040 U		
<b>NON-CARCINOGENS</b>								
1-METHYLNAPHTHALENE	16	53	0.0041 U	0.0038 U	0.0041 U	0.0040 U		
2-METHYLNAPHTHALENE	230	2200	0.0041 U	0.0038 U	0.0041 U	0.0040 U		
ACENAPHTHENE	3400	33000	0.0041 U	0.0038 U	0.0041 U	0.0040 U		
ACENAPHTHYLENE	3400 <sup>(2)</sup>	33000 <sup>(2)</sup>	0.0041 U	0.0038 U	0.0041 U	0.0040 U		
ANTHRACENE	17000	170000	0.0041 U	0.0038 U	0.0041 U	0.0040 U		
BENZO(G,H,I)PERYLENE	--	--	0.0037 J	0.0038 U	0.0147	0.0040 U		
FLUORANTHENE	2300	22000	0.0045 J	0.0035 J	0.0167	0.0040 U		
FLUORENE	2300 <sup>(3)</sup>	22000 <sup>(3)</sup>	0.0041 U	0.0038 U	0.0041 U	0.0040 U		
NAPHTHALENE	3.6	18	0.0025 U	0.0023 U	0.0025 U	0.0024 U		
PHENANTHRENE	--	--	0.0041 U	0.0023 J	0.0033 J	0.0040 U		
PYRENE	1700	17000	0.0041 J	0.0027 J	0.0163	0.0040 U		

(1) - The screening criteria was selected from the United States Environmental Protection Agency (USEPA)

Regional Screening Levels (RSLs) for residential and industrial soil (USEPA, 2013).

(2) - No RSL is available for acenaphthylene; therefore, the RSL for Acenaphthene was used as a surrogate.

(3) - No RSL is available for Fluorene; therefore, the RSL for Fluoranthene was used as a surrogate.

Indicates a cancer risk exceeding 10-4

Indicates a cancer risk exceeding 10-5

Compounds not included in calculation for the BaP equivalent

J - Estimated concentration

U - Concentration is less than the laboratory detection limit

UJ - Concentration is less than the laboratory detection limit, which is estimated mg/kg - Milligram per kilogram

NC - Not considered



**RESPONSES TO  
EPA COMMENTS DATED SEPTEMBER 13, 2013  
ON RESPONSES TO EPA COMMENTS DATED AUGUST 8, 2013  
ON NSA JULY 2013 NSA CRANE UXO 7 IMWP**

**Issue 1 - Thanks for the responses. I'm wondering if it would make sense to incorporate the sampling plan into the IMWP so it's contained within the work plan versus another separate document?**

Response: The sampling plan will be included in the UXO 7 IMWP as a stand-alone appendix. The plan will be in the form of Field Task Modification Request (FTMR). The objectives of the sampling will be described. Tables listing the samples and figures showing the sample locations will be included.

It should be noted that the objective is to provide data for use in the re-evaluation of human health and ecological risks. These data will not be used to determine whether a specific media cleanup standard (MCS) has been attained.

Section 3.7 and Appendix D have been added to the UXO 7 IMWP to address this comment, as indicated in the italic text below:

**3.7 EXCAVATION SAMPLING**

*The UXO 7 interim measures are being conducted to mitigate human health and ecological risks. During the proposed soil removal actions at UXO 7, soil samples will be collected from excavation sidewalls and floors, as necessary, and analyzed for lead and PAHs to provide the Navy data on the adequacy of the risk mitigation effort while the EMAC is still in the field. Appendix D contains the Sampling Plan for use in the UXO 7 soil excavation sampling. After the interim measures are completed, the post-removal action soil concentrations for PAH and lead concentrations at UXO 7 will be formally reassessed. The UXO 7 Interim Measures Report will include the screening level risk assessment and should confirm that the soil removal action successfully mitigated the excess human health and ecological risks at UXO 7.*

**Issue 2 - Comment 1: I don't view the approval of an Interim Measures Report as a formal Agency decision of NFA for the OPR. So given that small arms ranges are being investigated under the Navy Military Munitions Response Program, do you now view the OPR as part of unexploded ordnance (UXO) 7 and are you planning to include OPR in a CMP for UXO 7?**

Response: Section 3 of the OPR Interim Measures Report (IMR) stated:

*"Based on the results of confirmation sample analyses performed by the fixed-base laboratory (see Appendix D), the residual soil remaining within the Range 1 and Range 2 berms at the OPR is acceptable considering the United States Environmental Protection Agency (U.S. EPA) residential soil levels for lead. No further excavation of soil is required."*

The soil MCS was 400 mg/kg for lead. This MCS was met throughout the area of excavation. The objective of the Old Pistol Range IM was to meet an MCS based on protection of residential receptors. Ecological concerns were not considered. However, assuming that EPA accepts the proposed

MCS for soil lead at UXO 7 (192 mg/kg average and 652 mg/kg maximum) then it would also have been met at the OPR. The UXO 7 interim measures are being conducted to mitigate human health and ecological risks in the soil and eventually support a site recommendation for No Further Action (NFA) at UXO 7. To improve consensus on the site regulatory status of the Old Pistol Range (OPR), a brief discussion describing the previously completed interim measures at the OPR and the resulting post-removal action soil conditions will be added to UXO 7 IMR. A separate site recommendation for NFA at the OPR will be included in the UXO 7 IMR.

**Issue 3 - Comment 2:**

- a. The Navy needs to explain origin of the 652 mg/kg lead concentration and why it's appropriate for this site.**

Response: The 652 mg/kg lead value is the plant PRG from the Technical Memorandum, Ecological Media Cleanup Goals, SWMU 16 Surface Soil. Although the likely source of metals at SWMU 16 was ash from the incinerator, the PRG is appropriate for use at UXO 7 because the bioavailability of lead from the bullets/shot is not expected to be greater than the bioavailable of lead from the ash.

The following text was added after the second sentence in the last paragraph on page 2-1:

*"The MCGs of 192 mg/kg and 652 mg/kg for lead were developed using site specific toxicity/bioaccumulation testing at SWMU 16 at NSA Crane. The 192 mg/kg value is protective of invertivorous birds and the 652 mg/kg value is protective of plants. Although the likely source of metals at SWMU 16 was ash from the incinerator, the PRG is appropriate for use at UXO 7 because the bioavailability of lead from the bullets/shot is not expected to be greater than the bioavailability of lead from the ash."*

- b. Unlike animals, plants lack mobility and exposure is location specific (cannot be averaged over a large area). Also pH is measured on a log scale and simple averaging is not appropriate.**

Response: As stated in Section 2.3, Lead Risk Reduction and Mitigation in UXO 7 Former Old Rifle Range Soil, on page 2-10: "The MCGs for lead are reduction of lead concentrations to below an average of 192 mg/kg, with no soil remaining with a lead concentration greater than 652 mg/kg." Therefore, the plan was not to average the lead concentrations for comparison to the plant PRG. That being said, it is possible to have a few isolated locations with exceedences of the plant PRG, while still being protective of the plant population.

The Navy realizes that a simple averaging of the pH values is not technically correct, however, the purpose of the averaging was really to show that most of the pH values were close to 7. As discussed in the original response to Comment 2, the soil pH in five recently collected soil samples at UXO 7 were measured at 5.68, 6.71, 6.94, 6.97, and 7.87 standard units. Therefore, most values were close to 7.0, even though the true average may be closer to 6.0. No changes will be made to the IMWP based on this comment.

c. Toxicity tests at SWMU 16 had no effect on monocots (e.g., rye grass), but dicots (e.g., red clover) showed adverse effects. Sample SS114 showed some risk to monocots, but had a pH of 5.66. This may explain observed plant growth at UXO 7 by the Navy to favor monocots (grasses). Dicots are known to take up divalent ions more efficiently than monocots (Woodward et al. 1984, Plant and Soil vol 79 issue 2 pp 169-180).

Response: The Navy believes that reviewer means that Sample SS114 showed some risk to dicots, not monocots. The Navy agrees that Sample SS114 had a pH of 5.66, which may have been responsible for the observed toxicity in the red clover because the concentrations of metals in that sample were relatively low. The concentrations were expected to be low because Sample SS114 was collected from a reference location and not impacted by site activities, so it is more likely that the observed toxicity was related to the lower pH, vs. the metals concentrations. The Navy reviewed the referenced article and noted that the study was evaluating the root cation exchange capacity (CEC) to show that plants with greater root CECs, such as in the dicots they studied, accumulated more polyvalent metals. Note that lead was not one of the metals included in their study, although it is likely to have followed a similar pattern. That being said, accumulating more metals does not necessarily indicate that toxicity will be greater in those species, because plants have detoxification mechanisms that allow certain plants to accumulate high levels of metals without having toxic effects. The PRGs that were developed were based on metals concentrations in soil, not tissue, so the different accumulation rates for lead in the two species tested at SWMU 16 would not change the PRG. Also note that rye grass was selected as one of the test species because it was relevant to the site and the selection of that species was agreed to by EPA in a February 2, 2010 e-mail. The Navy also agreed to test red clover to bracket potential adverse effects. No changes will be made to the IMWP based on this comment.

d. The plant lead PRG developed for SWMU 16 was based on NOEC and LOEC with corresponding soil pH of 7.33 and 7.54 (samples SS102 & SS104), respectively. If toxic (LOEC) samples were restricted to soils pH in the range of 6.0 to 7.5, the LOEC selected in Table 11 for the SWMU 16 Tech Memo (Ecological Media Cleanup Goals) would be sample SS106 with 318 mg/kg lead (pH of 6.02). If sample SS106 was used for the LOEC, the PRG would be 454 mg/kg lead.

Response: The technical basis for restricting toxic samples to a pH of 6.0 to 7.5 is not known. However, if Sample SS104 was excluded from the toxic data set, then no LOECs would be developed because no concentrations in the toxic sample data set would be greater than the maximum concentration in the non-toxic data set. The lead concentration of 318 mg/kg in sample SS106 cannot be a LOEC because by definition, it has to be greater than the NOEC, which is 648 mg/kg. Also, note that three of the lead concentrations in the non-toxic data set were 422 mg/kg, 452 mg/kg, and 648 mg/kg, indicating that lead was not toxic at levels greater than 318 mg/kg. In fact, because the NOEC of 648 mg/kg is almost identical to the LOEC of 656 mg/kg (well within the range of field and laboratory variation), there is considerable uncertainty in whether lead was even the source of the observed toxicity in the toxicity test. However, the Navy had agreed to conservatively assume that the toxicity was due, in part, to the lead in the sample, which is why a PRG was developed for lead. For all these reasons, the Navy does not believe that it is appropriate to restrict the toxic data set to samples within a pH range of 6.0 to 7.5 to obtain a LOEC that is lower than the NOEC so no changes will be made to the IMWP based on this comment.

-----Original Message-----

**From:** Ramanauskas, Peter [mailto:[ramanauskas.peter@epa.gov](mailto:ramanauskas.peter@epa.gov)]

**Sent:** Thursday, November 14, 2013 15:24

**To:** Brent, Thomas CIV NAVFAC MW, PWD Crane EV

**Subject:** UXO 7 Composite Sampling FTMR#3

- 1) You should run a new correlation calculation on this newly collected XRF/lab data to account for potential variability in XRF calibration, etc.**

**RESPONSE:** A new correlation calculation will be run once sufficient field XRF and laboratory data collected during the interim measures is available. In the interim, data from historic calculations will be used as listed in FTMR Table 3. Once the new correlation data is available, existing Table 3 will be replaced. The comparisons made to the current version of Table 3 will be checked.

The last paragraph of the FTMR Section titled "Analysis" now reads as follows:

Lead samples will be initially analyzed in the field by XRF techniques. The field XRF data will be converted to laboratory-equivalent data using historical field/laboratory correlation data for UXO 7. The correlation between field XRF readings and laboratory-derived lead concentrations for previous soil samples collected at UXO 7 is presented in Table 3. *The data from Table 3 will be used only until sufficient data is available from the interim measures sampling to establish new correlations or verify the existing correlations. If new correlations are established based on interim measures data then comparisons made to the existing Table 3 will be reevaluated.* The soil lead concentration data collected from excavation sidewalls and floors during the IM will be evaluated by the Navy to determine whether additional excavations may be warranted to address excess risk.

- 2) What criteria will you be using to decide that the existing characterization of the lead and PAH already collected is sufficient in lieu of new sidewall or floor sampling?**

**RESPONSE:** Samples will be collected at all sidewalls and floors in all cases where data are not available at the vertical or horizontal boundary.

The first sentence of paragraph 1 and 2 of the FTMR Section titled "Sample Collection" has been modified, respectively, to read as follows:

*"Samples will be collected at all excavation sidewalls in all cases where data are not available at the horizontal boundary of the excavation."*

*"Samples will be collected from all excavation floors in all cases where data are not available at the vertical boundary of the excavation."*